

Storage in Ancient Complex Societies

**Manzanilla, Linda R.;
Rothman, Mitchell;**

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STORAGE

in Ancient Complex Societies

Administration, Organization, and Control



Edited by Linda R. Manzanilla
and Mitchell S Rothman

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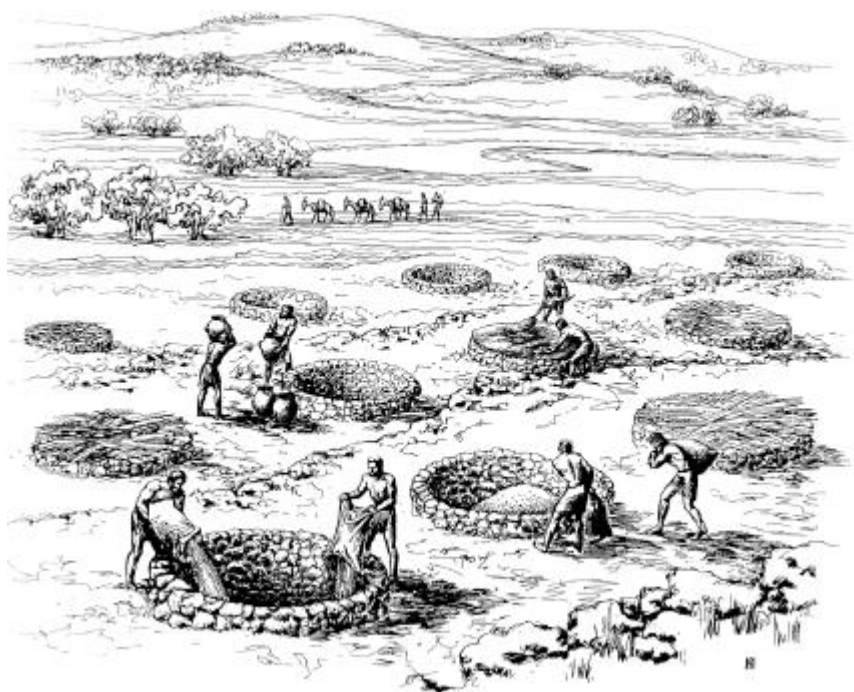


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Administration, Organization, and Control



Linda R. Manzanilla and Mitchell S Rothman

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PREFACE

Linda R. Manzanilla

The evolution of societal complexity is a major subject of archaeological inquiry. This volume addresses storage as one archaeological indicator of evolving organization and administration systems, in key areas of emergence of complex societies: the ancient Near East, Mesoamerica, and the Andean Region. It derives from a Society for American Archaeology (SAA) Annual Meeting Symposium that I organized in 2010, where we discussed cross-cultural evidence of storerooms, tokens, and administrative devices and their implication for social behavior and institutions.

The literature on storage as an independent variable for organization and administration is not vast (see [Chapter 1](#)). One example, devoted to Mesoamerica and northern Mexico, is *Almacenamiento prehispánico del Norte de México al Altiplano Central* (edited by Séverine Bortot, Dominique Michelet, Véronique Darras, Université de Paris I-CEMCA, 2012). However, no comprehensive, much less cross-cultural, volumes on storage as an analytical category in analyzing societal evolution exist.

In putting together the SAA session, I chose three areas where the control of goods and people may be followed as hallmarks of different types of societies. Through comparison of their evolutionary trajectories, we can see commonalities that Steward believes are apparent even in multilineal pathways (see Introduction). I also emphasized to session participants that we should have in mind what types of goods are stored, in what type of facility, in what social context, and how the goods are distributed at what intervals. The group was focused on many cases on which administrative mechanisms develop to control the flow of the stored goods. These are the main subjects of this volume: how archaeologists study storage and its role and its analytical significance in the evolution of systems of control, administration, and societal organization.

In [Chapter 1](#) Mitchell Rothman provides a theoretical look at the relationship between storage behavior and other aspects of culture in societies from those of hunter-gatherers to the state.

Following that, the first part of the volume is devoted to Near Eastern examples, where storage facilities have been present since the onset of sedentary life, both at familial and communal scales; these

facilities will later be incorporated into monumental ritual and secular structures, which organize redistributive and trading networks of state-level organizations. Unique to the Near East is a set of independent control mechanisms, seals and seal-impressed clay locks on doors and containers. As the use of these control mechanisms change over time, they develop into a bureaucratic tool to account for—that is, audit—these movements. Ultimately, this system is enhanced by a system of written, so-called Uruk IV tablets, which increase administrators' ability to collect and store information.

In [Chapter 2](#), Mitchell Rothman and Enrica Fiandra describe changing storage methods and their relationship to elaborating control systems from 4200 to 3000 BC, which ultimately trace a trajectory to state-level societies. Examples include Tepe Gawra in the piedmont of northeastern Iraq, Arslantepe in southeastern Turkey, and Uruk-Warka, the world's first great city in southern Iraq. All are involved in local systems of control, storage places, and in broad geographical trading networks. In each, a correlation of the use of seals and sealings as audited administrative mechanisms and eventually clay tablets and changes in storehouses and storerooms confirm the analytical power of storage to understand evolutionary changes.

In [Chapter 3](#), Ianir Milevski, Eliot Braun, Daniel Varga, and Yigal Israel analyze a late third millennium BC formal silo system at the site of Amasia, Nahal Lachish, between the Negev and first Judean Hills in Israel. This is early evidence of a surplus production system, presumably of grains that the author describes as a redistributive system, locally, but one also in contact with state-level Egyptian colonies with more formal, centralized control systems. These systems of storage reflect an evolution of centralized storage from earlier types in the same region as outlined in the final chapter.

In [Chapter 4](#) Tate Paulette continues where Rothman and Fiandra left off. He uses archaeological and written evidence to explore the central role played by grain and, in particular, grain storage within this broader struggle to define the contours of a rapidly evolving political economy. Over the course of the third millennium BC, Mesopotamia was swept up in a wave of political experimentation, economic restructuring, and ideological invention. Across the region, newly fashioned states struggled to establish control over the resources, the labor, and the allegiance of urban and rural populations.

Our second part is devoted to the Andean Region, a region where environmental phenomena cause severe risks for sedentary communities, and where storage is a key factor to face them.

In [Chapter 5](#), Thomas Pozorski and Shelia Pozorski describe a system of regularly laid-out storage structures, stamp and cylinder seals, and other emblems of bureaucratic control and status. Unlike the Near East, there are no corresponding sealings, but stamps are rather ideological symbols, perhaps used to stamp cloth. This chapter puts these features in context by first describing the complex polity that occupied the Casma Valley of Peru during the Initial Period (1800–1400 BC). Subsequent sections provide details about storage structures and especially their modular architectural form, which became emblematic of bureaucratic power and control within the polity.

In [Chapter 6](#), John R. Topic shows the relations among data-recording devices, a system of storage units, and the structure of the Chimú and Inka states of Peru. He begins by describing the Inka *quipu*, a record-keeping device. He then describes an earlier device used by the Chimú (ca. AD 850–1470) that was based on a specific form of architecture combined with the use of tokens for recording information. The Chimú device is closely associated with large numbers of storage complexes. He explores how the arrangements of storage complexes among the Inka and the Chimú may have also contributed to the recording of information as part of their imperial system.

In [Chapter 7](#), R. Alan Covey, Kylie E. Quave, and Catherine E. Covey discuss state-directed storage in the Inka Empire (AD 1400–1530), particularly storage systems in provincial regions, as well as the area around Cuzco, the imperial capital, with an overview of the architectural and archaeological evidence of Inka storehouses, and the implications of the evidence for interpreting the parts of the economy dominated by local Inka nobles and by imperial political economies. They conclude that the local, noble-directed economy dominated the most productive parts of the region; political economy was focused on exotic raw materials and labor coming from provincial regions.

In [Chapter 8](#), Frank Salomon, Gino de las Casas, and Víctor Falcón-Huayta address an ethnographic use of the *quipu*. Particularly, the village of Rapaz (Peru) managed its communal sector (fields, canals, terraces, pastures, and herds) through a ritual-administrative complex located in a walled precinct. The precinct's two buildings are a *qulka* or Andean storehouse, and a still-used sacred meetinghouse, the home of a collection of *quipus*, where traditional authorities governed the sector of the common people they ruled. Ethnographic songs and other information clarify the relationships among storage, governance, ritual, and communal economy. This chapter emphasizes harvest collection and disbursal through the storehouse, an administrative

system with a marked feminine symbolic association.

Our third part is devoted to Mesoamerican examples. In some cases storage of foodstuffs is a key issue for political control. In others, the control of labor seems to be more important.

In [Chapter 9](#), Linda R. Manzanilla reviews the scarce data on centralized storage at Teotihuacan, one of the first vast urban developments of Classic Central Mexico (first six centuries AD), and concludes that the political economy was not focused on central control of staple goods, but rather on controlling certain sumptuary raw materials, such as jadeite and mica, and competing with neighborhood centers managed by the intermediate elite. In such centers, a series of tokens for specialized labor may be evident in the archaeological record. She argues that the size of roundels (small, medium- size, and large), the raw materials in which they are made (pottery, mica, slate, shell), and the existence of parts of roundels (especially complete, halves, and quarters) may represent a system related to persons involved in the life of the multiethnic neighborhood centers, and their partners in the corridors toward sumptuary good provisioning regions. Storage may not therefore be centralized, but spread among individual households and neighborhoods controlled by nobles.

In [Chapter 10](#), Silvia T. Garza-Tarazona, Claudia Alvarado-Léon, Norberto González-Crespo, and Beatriz Palavicini-Beltrán discuss the Epiclassic site of Xochicalco, in Morelos, Mexico. Given the hierarchical structure at Xochicalco, the ruling class survived by obtaining tribute from their subject villages. In particular, the city's acropolis represented the need for specific areas for storage, protection, and control of all types of goods and products from the territories under military subjugation in specialized workshops for preparation of food and goods. The evidence in the upper part of the city allows them to suggest that the food stored in the *graneros* (storehouses) was used for the subsistence of priests, rulers, and full-time specialists working within the Acropolis workshops. The *tinajas* (*piithoi*) found in the rooms related to the *graneros* in both the Acropolis and the structures G4 and G11 in the Main Plaza were used for the preparation of large quantities of food.

In [Chapter 11](#), Michael P. Smyth describes the critical importance of storage to ancient Maya political economies. Even though the Maya occupied a tropical environment, the growing season was not year-round, and many environmental factors limited surplus production. Under these conditions, the maintenance of large sedentary, agriculturally dependent populations required substantial investment in storage. Clearly, the political administration of tribute collection

and its storage was fundamental to elite power structures and the organization of storage can reveal much about the Maya political economy. This chapter explores differences in storage strategies, how and where goods are stored, and how stored goods are administered, as a way to reconstruct the political structure among the lowland Maya.

In [Chapter 12](#), Cristina Vidal-Lorenzo, M^a. Luisa Vázquez-de-Ágredos-Pascual, and Gaspar Muñoz-Cosme also deal with storage systems used in the Maya area, but on the basis of archaeological, iconographic, literary, or ethnographic sources. Structures to store food and other domestic items of the common population were always of a perishable nature, in the same manner as their dwellings, except in cases such as that of Joya de Cerén (buried under volcanic ash). With respect to the water storage facilities these, to the contrary, tend to be well documented. The property of the ruling group was stored within the palaces; scenes showing the exchange of gifts or tributes, such as those captured on the beautiful Maya polychrome ceramics, suggest that all of these objects (vases, jaguar skins, feathers, blankets, cacao, and so on) had to be suitably and immediately stored away in rooms close to those where they were received, as exemplified by the palace complex at the Maya Acropolis of LaBlanca.

In [Chapter 13](#), José Luis de Rojas stresses that storage and administration formed part of the Aztec Empire societal structure. In Tenochtitlan, the capital of the Triple Alliance, there were different stores of diverse size in which different items were kept, including grains, for example, buildings named *petlacalco*, a dependency specialized in economic affairs, where tribute goods were stored. The administrator was the *huey calpixqui*, together with *mayordomos*, treasurers, counters, tax collectors, and the rest of officials in charge of the treasury. Another indirect evidence of the existence of Aztec stores is the presence in the documentary sources of people in charge of the collecting and administration of tribute. For the Mexica case, we have two different types of evidence: administrators residing in the royal palace at Tenochtitlan and those who were in towns and provinces subject to the Aztec Empire.

In [Chapter 14](#), the editors bring together the commonalities and differences in the various cases to find the general principles that underlie storage and evolution.

CHAPTER ONE

STORAGE AS AN ANALYTICAL MARKER FOR STUDYING CULTURAL EVOLUTION

Mitchell S Rothman

Introduction

The history of archaeology has really been a search for origins. Once modern humans appeared, what were the processes by which the cultural systems they created and the societies that were derived from those cultures evolved to the forms we see today ethnographically? For the Old World, the chronological detonators—Neolithic, Chalcolithic, Bronze, and Iron Ages—show the antiquity of the question, as these along with their final Age of Gold come from the ancient Greeks (Daniel 1967). The core questions early investigators and modern researchers still ask are the following: (1) what is the distinctive nature of cultural systems and societies that defines their differences, (2) how are/were societies organized and how does the understanding of their organization help us understand how they functioned, and (3) what caused fundamental changes in their nature and functioning and therefore the evolution of new cultural systems and societal forms?

Since World War II, these questions have been encapsulated in attempts at explaining the rise of state-level society (e.g., Wright and Johnson 1975; Wright 1977; Johnson 1973; Chapman 2003; Feinman and Marcus 1998; Bentley, Maschner, and Chippindale 2008). The other major questions were about the domestication of plants and animals and its effects on developing Neolithic societies. Researchers usually discussed less complex societal forms only as precursors of the state. While the state is still a topic of keen interest, as reflected in many of the chapters in this volume, post-Neolithic, pre-state (middle range; Chapman 2003) societies are emerging as a topic in their own right (Bolger and Maguire 2010; Carter and Philip 2010).

If the goal is to understand the full span of human cultural development, archaeologists must be able to answer the questions above. Some (Pauketat 2001; Hodder 1986) are satisfied to understand the history of particular cultures and societies through a discovery of their practices. Traditionally, anthropological

archaeologists have sought to find common cultural patterns and the processes they represent across space and time. As an analogy, Lyell (1836) studied the formation of features of the Earth's topography. What he found were particular cases, but also a set of fairly uniform patterns of change, such as upthrust and subsidence, that underlay the evolution of geological forms in many particular places. These patterns he proposed were recurring processes that geologists could use to understand what they discovered in new cases. Like Lyell, for many anthropological archaeologists a key methodology is seeking common patterns of functioning, growth, and change that reveal common processes applicable to many already discovered and new cases. This is different than looking for "general laws" (Binford 1972; Watson, LeBlanc, and Redman 1984) as early New Archaeologists proposed. Explanation, the why questions, requires an elucidation of these underlying processes through which the three questions asked at the beginning of this chapter can be answered.

Part of the methodological problem of comparison is finding clear evidentiary markers within and across different societies that existed throughout the long evolutionary trajectory of human cultures and societies that permit archaeologists to compare like with like. A necessary step is therefore to show how these markers relate systematically to other cultural and societal elements in order to establish a basis for cross-cultural comparison.

The editors of this volume suggest that storage, a necessity common to all sedentary and many nomadic societies globally from the before the Neolithic onward, is *one*, if certainly not the only such, marker that may aid us in this quest. In order to demonstrate its utility, this chapter will (1) summarize some of the ethnographic and archaeological cases on storage and societal organization, practices, and change to exemplify some dimensions of the problem, and (2) seek some general principles for researching the variables and interconnections that relate storage practice to societal organization and dynamics.

Storage in the Nexus of Human Evolution

Storage in this context means archaeologically recoverable remains of storage: plastered pits, collections of storage jars, storerooms, and storage buildings. Other storage mechanisms like sacks or gourds are ethnographically and historically attested, and will be assessed where possible.

Looking at societies' core economic endeavor—food production—the archaeological and ethnographic literature clearly attests

connections between storage systems and different adaptive strategies (or practices) and processes of change. As Wesson (1999: 155) writes, "Storage played a significant role in, or is a reflection of, the development of new social and political practices." At the core of issues of storage is *control* of raw materials and produced goods and how they will be distributed and consumed—in other words, what and for whom they will be used.

Among hunters and gatherers, the most ancient forms of dealing with environment for food, the issue of storage is already evident. As Fink (2007) reports, northern Alaskan hunter-gatherers originally stored their surplus in the form of dried fish, birds, oil, and sea mammals beneath their houses. This resulted from conflict in the form of tundra warfare. During this early period women had equal access to these goods in terms of trade or consumption, and this also gave them a role in decision making. Men's status derived from their efforts in warfare. The production unit was the household. After Anglo-American and Russian colonialists put an end to the warfare, the entire social structure changed. Demand was high for animal pelts and preserved fish, whose hunting and processing were the realm of men. When the Alaskan natives engaged in the market with colonial powers, they moved storage outside the house and aboveground. Men maintained the locks and control over the food and furs stored for trade. The relationships between men and women changed, as women now did most of their work to service the economic activities of men.

Among the natives of the northwest coast of the Americas, a somewhat different picture emerges. They were also hunter-gatherers, especially of sea and river foods, organized into extended households for production and consumption (Ames 1994). Unlike the Alaskan natives studied by Fink, changing food-getting strategies yielded a degree of social ranking, concomitant with the beginning of significant storage activity. The households already had a division of labor based on age, gender, specialist-nonspecialist, free-slaves, and higher- or lower-ranked individuals. Still, they practiced a basic domestic mode of production (Sahlins 1972). Trade and kinship ties integrated the household into the village and larger social units. Each of the units had simultaneous tasks assigned to them, the one of highest value being the catching and processing of salmon. The concentration of seasonal salmon runs in certain places increased the sedentism of populations into multiple household units. These settlements were separated from household clusters in other places. Each settlement cluster was typified by a different concentration of salmon. Variability in the degree of rank correlated with the supply of salmon controlled by these household heads. The heads of these households became

more powerful in the larger unit if their source of salmon was richer. The larger supply of salmon accommodated more population and more trade. Storerooms in villages associated with leaders appeared early on, and their size along with smokehouses indicate the intensity of production. The larger of these are also associated with elaborate and rarely occurring graves. Similar developments in northern Alaska show a dual organization (Hoffman 1999). On one hand, households maintained their own food storage houses, yet the community as a whole shared larger feasting storage units under the control of some individuals with higher rank.

Storage was a key issue once domestication of plants and animals appeared in the Neolithic. Unlike the nomadic or seminomadic lifestyle of most hunter-gatherers, early agricultural communities had to deal with storage of crops and animals, which would have been too voluminous to carry or to move. Kuijt (2009) points to the association of initial agriculture and a rise in storage. This storage system was more than a practicality, however. Kuijt (2009) argues that all the early agricultural societies of the Levant yielded evidence of feasting behavior, not as a competitive ritual but as a means of integrating newly founded, settled communities.

These cases imply that concepts like the culture core of Steward (1955), while adding much to our understanding of societal evolution (see below), need to be reexamined. In these cases some of the hunter-gatherer cultures would be more complex or more “chiefly” by the definitions of Service (1962) and others (Wright 1994) than some early agricultural communities. The Northwest American example challenges that assumption (see also Testart et al. 1982).

The theorized next step in cultural evolution would be societies with institutional ranking and social stratification. They represent larger societies most often (though not exclusively) with intensive agriculture. “From a materialistic perspective, only after elites install themselves in positions critical to the economic life of their communities can they turn their attention to other means of social control” (Wesson 1999: 146). The transition from a temporary leadership like the “Big Man” (Sahlins 1963) to ranked individuals or groups is most often based on the development of surpluses (Blitz 1993). This pattern is evident among the Northwest Coast Indians, but not to the extent that the community depended on those who controlled and traded fish. Storage in the southeast United States was a communal activity, and most houses lacked private storage (Wesson 1999). As in the Cahokia settlement system, those sites near the center had little evidence of domestic storage, but farther away from Cahokia itself, large domestic subterranean storage units were common.

DeBoer (1988) proposes that the leaders at Cahokia expropriated any surplus to bring to the center and store it there for their own purposes, but those farther away were able to resist. This is what Wesson, referring to Bourdieu, calls symbolic capital: “Viewed from the perspective of prestige goods and symbolic capital, the relationship between food storage and chiefly power can be understood as a competitive process where surpluses were mobilized to advance elite interests” (1999: 157). Leadership groups used part of this symbolic capital to create other kinds of social capital, such as feasting, gift giving, acquiring prestige goods, and placing those goods in the graves of leaders as symbols of wealth (Renfrew 1986). These ritual contexts created a series of binding obligations and rights between leader and follower.

In more complex societies, feasting is known ethnographically (Junker 1999; Fleisher 2010) and archaeologically (Blitz 1993; Holly 1998; Helwing 2003; Grimstead and Bayham 2010; Rothman and Badler 2011) as a means for competing over status and rank. Much of the ancient feasting involved animals more than crops. Ritual, such as feasting or gifts to the gods, is often at the core of it, if only as a way to generate the surpluses to be used in feasts often for a political purpose (Stein 1998; Grimstead and Bayham 2010).

Parenthetically, in order to make sense of these evolutionary pathways, terms are important: *exchange* versus *trade*, and the commonly used term *elites*. Wesson, Hoffman, and others call these new leaders even of hunter-gatherer societies *elites*. Others regularly refer to the upper level of hierarchies in the most complex societies as elites as well (Frangipane 2001). Manzanilla (this volume) calls the controlling groups of neighborhoods at Teotihuacan “intermediate elites.” The reader should be aware that what is *elite* makes sense only within a given context, and is often not the same institution across different societies at differing scales of complexity.

All of which raises the question of what is the nature of the most complex societies we discuss in this volume—namely, states? Even those who emphasize practice theory or the more mental, as opposed to materialistic side of human societies (Porter 2012) recognize this as a useful term. Yet scholars often see the state as the leadership group itself, as is the case with those who would use decision-making (administrative) hierarchies as the core of state society and the scale to measure of societal change (Wright 1977, 1994). But understanding storage as a measure of various kinds of societal relationships across diverse groups, including but not limited to the leadership group, assumes that state societies are by definition heterogeneous (Crumley 1995; Brumfiel 1995; Stein 1998), not a static tableaux of leaders and

the led. This means that there are various loci of control; states are, as Porter (2012) argues, the whole society. As in the Cahokia example cited above, different loci of control as evidenced in storage practices reflect not simply the control of one leadership group, but a series of interrelationships among varying groups, each with some degree of control over their production and the disposition of products of their work.

As such, understanding the larger societal meaning of storage involves not only who is doing the storing, but also what is being stored (see Manzanilla, this volume). Classically, foodstuffs are one major focus for storage behavior (Paulette, this volume). Adams (1981), for example, sees the origin of state control or decision-making institutions in Mesopotamia as the result of control of surplus foods. Having access to significant stores of food, especially in one of the regular unproductive years, gave leaders control of groups dependent on the surplus food (Rothman 1994). Therefore, the heart of the first real city, Uruk-Warka, is dominated by a palace, temples, and storehouses in the Eanna district (Nissen 2001).

As groups evolved with some ability to collect and decide on how that surplus was used, “attempts by dominant groups to gain (or maintain) power or control over others, are often countered by alternative ideologies that promote both active and symbolic resistance to this domination” (Wesson 1999: 152–53). Even the leadership institutions of states have different motivations (Blanton et al. 1996). Sometimes their goal is to advantage the whole of their society through their use of the mechanisms of control (corporate strategy). Other times leaders seek to establish relationships with other leadership groups outside their locality through trade and other interactions, such as exchanging wives (network strategy). The leaders in that case are seeking to promote the interests of their own group rather than some sense of the common good. This does not mean that the rest of the population of the state has no countermeasures or alternative spheres of control, especially in the use of markets for exchange (Feinman 2014). In this sense even domestic production is not necessarily only for provisioning but often includes production for surpluses.

Whereas control of foodstuffs is a common theme in the examples discussed above and in a number of the case studies in this volume, control of craft goods can be equally important. For example, in the Inka colonized state of Xauxa, as many as two thousand large storehouses contained both craft goods and foodstuffs to support local administrators (D’Altroy and Hastorf 1984; see also [Chapter 6](#), this volume). These stored goods paid for the *corvéé* workers, specialists,

and soldiers, and established the royal economy of trade. Teotihuacan, another example, based much of its evolution on the exportation of obsidian blades (Webster, Evans, and Sanders 1993) and the movement of sumptuary goods. This interregional trading system was one foundation of the adaptation that the city and its hinterland represents, but it spawned a broad-based organization of crafts persons, farmers, administrators, and religious leaders in single and multifamily platforms across the city settlement. In addition, exchange and control of sumptuary, luxury, or prestige goods can be a significant part of the economy's growth among complex societies (Manzanilla, this volume; Algaze 2008; Eckholm 1977).

Yet storage can be not only of foodstuffs (including animals), craft goods, and raw materials. Although primarily economic or economic with uses in political or ideological practices, storage can include noneconomic goods. In the Sumerian, Akkadian, and Old Babylonian periods (mid-third to mid-second millennia BC), the resources of the great institutions of palace and temple were primarily supported by ownership of vast holdings of arable land, as much or more than taxation or tribute (Sallaberger 2013; Sterba 1976; Yoffee 1995). An inherent conflict of control emerged between the institutions of state and temple. One way the palace leaders controlled the temple administrators was by forcing temples to store the religious symbols of the king in separate storage rooms for use in royal rituals in the temple (Sallaberger 2013) and sometimes storing temple ritual artifacts in the palace.

Storage plays a role in all of these cases. The kinds of storage often speak to the nature of food production (Smyth 1989). Smyth asks whether the storage media are inside or outside the house (building); what the volume capable of being stored is; and whether materials are for short-term or longer-term storage, for holding surplus to supply people in their times of need, or to keep resources for public works. Storage, as the reader will see in the following chapters, is also about craft goods and raw materials. "Since storage is a critical but poorly understood component of complex societies, a great deal of additional research attention is necessary . . . Further studies into domestic [communal, and central] storage behavior could be undertaken in societies that have contrasting cultural, environmental, and subsistence bases" (Smyth 1989: 123). This is the exact intent of the current volume.

Relating Storage Practice to Evolving Social Organization and Administration

The discussion above illustrates the many complex social, economic, political, and ideological relationships relating to storage. This current section aims at synthesizing them in a way that they provide a road map for understanding the relationship of storage to cultural and societal evolution. They therefore help address the questions asked at the beginning of this chapter: (1) what is the distinctive nature of cultural systems that defines their differences, (2) how are/were societies organized, and how does the understanding of their organization help us understand how they functioned, and (3) what caused fundamental changes in their nature and functioning and therefore the evolution of new cultural systems and societal forms?

Throughout this chapter so far I have been using the terms *culture* and *society* not as synonymous but interrelated. The term *culture* over time has had two different meanings. One described the whole matrix of cultural behaviors, ideas, practices, institutions, and customs *within a bounded space*. One could speak about *the French culture*, for example, in contrast to *the German culture*. *Culture* became almost a synonym with *nationality*. On the other hand, culture could be seen as being a less bounded and homogeneous cultural tradition, retaining some of the total corpus of cultural patterns, behaviors, and ideas in some contexts, while others elsewhere. It is not a package in which every element had to be shared. The less bounded idea of culture, to me, leaves open the opportunity to view cultural traditions and their distribution in the complex, messy way they actually exist and existed. Sometimes they did exist within borders, but in the ancient world they more probably existed within less rigid frontiers (Anthony 2007: 102–3).

I think a useful way to begin to make sense of this for archaeologists, lacking so much information available to ethnographers, is to differentiate units of organization from culture, the latter as the more mental aspects for analytical purposes. Whereas they obviously are intimately intertwined, studying these aspects separately promotes clarity in the kinds of processes that are happening. Geographically delimited, politically and economically integrated groups would be called “societies” Smith (2003) would call these landscapes created by political action. I agree with Wilkinson (2014) that *networks*, which emphasizes various kinds of interrelationships, is another apt term. As a series of overlapping networks, societies can have differing geographical ranges: the economic/trade, the social/marriage and cooperation, the ideological, the political. The last of these, when associated with a particular landscape, would be called a polity (Smith 2003). Societies would tend to have a dominant cultural tradition, but could be pluralistic

with people of a number of different traditions or people who practice a hybrid of cultural traditions. One should then be speaking about cultural traditions that at times dominate a society and at times are carried by individuals across society or polity borders or frontiers. Cultural traditions operate originally in distinct societies, so one culture can encompass a series of different societies. However, as people from a society move into other societies in which theirs is not the dominant cultural tradition, or vice versa, we can speak of an ethnicity. That is to say, ethnicity is not the description of culture of a society, but one distinct cultural/mental package within a society that is distinguished from others, especially from the dominant tradition. For example, the cultural origin of the founders of the United States, Western European Protestants, has been the dominant American tradition. Hence we celebrate their annual holiday, Thanksgiving, as a national holiday, whereas other ethnicities' holidays (Italian, Irish, African American, Polish, and so on) are celebrated only by their members. Cultural traditions can evolve as can societal organizational structures. They are part of one single phenomenon, but at the same time the relationship between the two can vary across space and time and therefore has to be investigated, not assumed.

The core of societal organization in terms of storage behavior is control. This control as societies evolve can become centralized, but is always to some degree heterogeneous. States are defined as much by the heterogeneity of their populations as by their central control (decision-making) institutions. That is to say, leadership groups can gain control of some functions, but they never control everything; there are always other groups who have control over some aspect of their lives as individuals or associations. They might be the landowner councils of Mesopotamian city-states, as opposed to the temple or palace (Yoffee 1995). They are often households or smaller communities, sometimes ethnic ones (Manzanilla, this volume). One of the measures of evolution, as the chapters in this volume illustrate, is the developing centralization of storage functions and the differing social relationships (networks of cooperation) that this reflects. One can see these as practices, although the essential claim of this book is that they are practices that exhibit common patterns across space and time.

Parenthetically, *power* is often the term used as opposed to *control* (e.g., Stein 1998; Earle 1991; Potter and Perry 2000; Hill, Jones, and Morales 2013), where “power is ‘the ability to pursue and attain goals through mastery of one’s environment’ and can be exercised collectively or individually by people over each other or their surroundings” (Stein 1998: 6). However, the term *power*, in my

opinion, like *elites*, tends to imply control by superior forces and is really about control of specific societal functions (workers [military, policing, food or craft production, agents in bureaucracies], means of production, trade, taxation or tribute, *storage*, and so on). *Control* as a term is less specific than power, and certainly less often used in literature about state institutions. It is hard to speak of the power of a family farmer, although they make many decisions that exert their control over aspects of their lives.

Assumed in this approach is the idea of agency (Wright 2007; Gardiner 2008; Blanton et al. 1996). The actions of any society (its practices) are the sum of the decisions made by every member and those within larger societal institutions. This is somewhat like bio-evolutionary theory where selection works on the genotypes of each individual member of the species based on their actions and characteristic phenotypes. The evolution of the species is measured at the population level. It is the sum of the responses that creates the defining characteristics of the species, and embodies its evolutionary changes. Many of these reactions, such as those between surplus and ranking, are tied to person-to-person relationships and the use of stored surpluses (Halstead 1982).

For societies, the equivalent of a biological population is a culture and a society, the mental and ideological elements, on one hand, and the social, economic, and political ones, on the other hand. The organization of a society is a key element to relate storage to larger societal networks and cultural elements (Rothman 2004). Strategies are created by each player and institutionalized group of players to attempt to meet goals set out for them. These strategies represent the adaptations of humans and generally human societies to the environmental and societal circumstances in which they find themselves. They can be represented as collective action (Blanton 2010) in which adaptation to ecological transformations forms the basis of change, particularly state formation.

Changing conditions and strategies result from a variety of circumstances. One is climate change, which was a chief cause of the rise of the human species in the first place. Within climatic conditions a related factor is risk. Perceptions of risk and uncertainty (Halstead and O'Shea 1989; Colson 1979; Cancian 1972; [Chapter 7](#), this volume) are strong forces for selecting particular strategies and organizations to respond to them. In the cases outlined above, Adams's (1981) theory of the origins of the Mesopotamian state rely on the inconsistent productivity of agriculture in the alluvium. In the very first case of hunter-gatherers discussed above, the prevalence of warfare, a humanly induced risk, created one kind of relationship

between men and women. When the risk of warfare disappeared, so did that relationship along gender lines, replaced by a new one. Both cases illustrated the correlation of changing social and political organization *and* storage practice.

Other factors include access to goods and technologies, dialectic stresses within society (McGuire and Saitta 1996), changing ideological views, especially those that open opportunities for groups and individuals to promote themselves into new statuses and roles (Flannery 1972; Rothman 2004), and intercultural relationships like those during the later fourth millennium BC in Mesopotamia (Rothman 2001). At that time, the creation of the Uruk expansion trading network catalyzed changes already under way in the resource extraction areas north and east of the alluvium (for example, Frangipane 2010).

All of these strategies are derived from conditions but also limited and to some degree directed by cultural ideas. As Giddens argued, "Social structures are said to be both the medium of action or make action possible, and are reproduced by social action. [...] social structure exists in the minds of individuals as practical knowledge of what rules (taken-for-granted procedures or conventions) and what resources (material and social facilities to get things done) are necessary and appropriate for social behavior in diverse situations" (Seidman 1994: 148). According to this school, there was a middle place between practice and structure, *habitus*. "The habitus are defined as durable but transposable dispositions, including, for example, a sense of honour, [...] and other structuring principles. The habitus are strategy generating principles enabling agents to cope with unforeseen situations" (Hodder 1986: 74).

For many anthropological archaeologists those social structures were more in the sphere of society than culture. For many years, societal evolution was viewed in terms of stages of development. The nature of societies was described with the now well-worn nomenclature of band, tribe, chiefdom, and state (Service 1962) or as the relation of economic modes of distribution to organizational types (Fried 1967). Both schemes were extremely useful for comparison and as a subject of analysis (Earle 1991; Bentley et al. 2008). However, scholars have recently objected to their static nature and the underlying assumption of a kind of unilinear evolutionary pathway (Rothman 2004). Too many studies became a search to determine whether society such-and-such was, for example, a state, rather than using these as general categories only for comparison. Few modern students of archaeology remember that these criticisms are not new. "Multilinear evolution is ... based on the assumption that significant

regularities in cultural change occur [...] It is inevitably concerned also with historical reconstruction, but it does not expect that historical data can be classified into universal stages [...] Multilinear evolution, therefore, has no a priori scheme or laws” (Steward 1955: 18–19). The emphasis on a less typological and more longitudinal viewpoint to some degree changes the focus.

It is implicit in the evolutionary view that development levels are marked by the appearance of qualitatively distinct patterns or types of organization. Just as simple unicellular forms of life are succeeded by multicellular and internally specialized forms which have distinct types of total organization, so social forms consisting of families and lineages are succeeded by multifamiliar communities, bands or tribes, and these, in turn, by state patterns, each involving not only greater internal heterogeneity and specialization, but wholly new kinds of over-all integration. (Steward 1955: 13)

Flannery (1972) hinted at this in his seminal work on cultural ecology and systematics. He focused on centralization, which he defined as “the degree of linkage between various sub-systems and the highest-order controls in society” (409), that is, forms of integration in state-level societies.

Another analytical aspect is implied by highlighting integration as a key process of societal formation and change. Implicit in this is the idea that another way to look at evolution is to compare how trajectories change as much as societies at particular stages of development (Rothman 2004). The editors explore this so far underused perspective particularly for Near Eastern cases in [Chapter 14](#) of this volume.

If one is to use storage as a marker of societal and cultural evolution, one does need some idea of what the nature of the societies in question is (question 1 above) to compare like with like. That means that one has to understand the kinds of interrelationships that must be integrated into a particular society (question 2 above). The older nomenclature of Service has proven too static and bounded to do this; so how do archaeologists go about understanding organization?

A number of different kinds of distinctions exist as alternatives to the Service model. Wallace (1971) distinguishes kinship from community from administrative forms of social organization. Fiske (1991) offers a classification of such organizational relationships. In his system, relationships of a society would vary from a communal sharing mode to equality sharing to authority ranking.

The administrative or authority ranking is most associated with the state. One way we have come to see the distinction is in terms of an

emphasis on coordination versus regulation. Coordination, on the one hand, involves “the mutual inter adjustment” of “the rates of activity of the members of an acting group” (Miller 1960: 177). Regulation, on the other hand, involves the authority to create a plan defining the nature and goals of at least some activities, initiating action aimed at fulfilling those goals, and maintaining “the continuity of activities” by means of giving orders (Miller 1960: 179). One is more about institutionalized influence, the other about political control. In the early stages of leadership, for example, in southwestern America would-be leaders used familial ties to mobilize labor, thereby establishing *de facto* control (Mills 2000).

Centralized leadership characterizes the most complex ancient societies. While the leadership is centralized, the social structure is the most heterogeneous. Administrative, regulatory institutions are not necessarily all identical. Based on their location, scale, various kinds of intersocietal/cultural interactions, and particular histories, the strategies of various individuals and groups form different kinds of organizational structure and integration, and generate different selective pressures. For example, D’Altroy and Earle (1985) theorize that in societies developing rank, different dynamics will be set up depending on whether the newly institutionalized leadership relies on staple (largely food) or wealth (raw materials and craft goods) finance (see Rothman and Fiandra, [Chapter 2](#), this volume). As mentioned above, Blanton et al. (1996) define the different manifestations of the state as being determined by the motivations of leaders.

These strategies ultimately result in a number of interrelated changes in the deep structure of society and culture. In the Mesopotamian case mentioned above (Adams 1981), the centralization of control mechanisms (at least to some degree), was concomitant with the following:

- (1)
reorganization of both agricultural and craft production (Algaze 2008);
- (2)
promotion of individuals and groups into higher-ranking positions;
- (3)
restructuring the functions and relationships within centers and between centers and their satellite communities;
- (4)
creating marked social stratification.

These were all connected to new concepts of the divine and to a powerful temple sector that was intimately involved with sanctifying the leaders and controlling part of the agricultural sector. The culture and society of southern Mesopotamia underwent a radical change in social structure. Our assertion in this and other cases is that the use of storage is a key correlate of the kinds of changes archaeologists are observing.

One caveat is necessary for archaeologists going forward. There is a tendency in this analytical effort to “look back” (Vitelli 1999). Societies are not organizing and behaving as they do to become more complex in the future. No society adapts consciously to become a state. They are responding to address current stressors or to achieve an advantage in their current circumstances. “Looking up” emphasizes how populations adapt to the conditions they perceive. This latter perspective thereby reduces the amount of reductionist logic.

Trying to pull some of these threads together, I argue that it is possible to see some patterns that correlate storage to the evolution of societal organization. Based on the evolutionary model of social structure, a rough categorization of the kinds of social relationships and integration is possible to draw. Putting together Frangipane’s (2007) and Fiske’s (1991) ideas about a way to categorize networks of societal relationships and integration, types not necessarily stages, I would suggest the following categories as a basis for comparison.

Horizontal Egalitarian Systems

This model of kinship society is one of equality among all individuals and groups. Frangipane (2007: 153) calls these horizontal egalitarian systems, in which “in addition to the absence of differences between resource distribution and access, all members of the community were essentially of the same status and decision-making tasks were horizontally distributed both within each group (by sex and age ...) and between ‘related’ communities in a given territory (by means of flexible enlarged institutions [like] sodalities and periodic communal events, such as assemblies, religious ceremonies, feasts, etc.).” This can be related to the concept of communal sharing (Fiske 1991) on a society-wide basis, which Frangipane sees as being evidenced in shared storage, diffuse settlement patterns, poorly distinguished boundaries between houses, egalitarian distribution of goods, and equality in funeral ideology. Religion would be more shamanistic than priestly, not requiring formal temples, and identity would be very open-ended. Production would follow a kinship mode in which people were self-reliant (Wolf 1982). If ownership of the means of production

existed at all, they shared it equally, and value was vested in community, not in the intrinsic value of goods (Wolf 1982: 73–74). The example of Alaskans by Finke (2007) discussed above would fit here.

Vertical Egalitarian Systems

Even though the society as a whole is based on concepts of equality and economic self-reliance, vertical egalitarian systems “were accompanied by a system of social and kinship relations which gave and legitimized a kind of privileged status to certain members of the community depending on their genealogical position, true or presumed, entitling them to represent the community and take up its governance. [...] In these societies, unlike the former type, the role of more or less extended household groups played a very important part, and membership of the family was more important than membership in the group as a whole” (Frangipane 2007: 153). In the American southwest, Mills (2000) gives an example of how this would work. She shows how nascent leaders used their kinship networks to establish some inequality. They recruited their kin to produce foodstuffs, build communal buildings, and organize exchange networks. Overall, the signs of this kind of structure are standardized, easily recognized individual buildings, domestic storage, special treatment of family founders, and reference to a central religious authority. Specialized communal storage is also possible. As opposed to communal sharing, the dominant mode of interaction is equality sharing (Fiske 1991) in which the families and groups existed in balance. The leadership group never got much authority and the larger body politic could readily check their power. Coordination is still the mode of organizing control. This social type tends to be a somewhat unstable form. The northwest American coast societies described by Ames (1994) discussed above fits here.

Ranked, Coordinated Society

As described by Wright (1994), ranked society breaches that line from what we can call the egalitarian society. It tends toward what Fiske (1991) calls authority ranking, in which the leadership group has some limited authority. It is more an administrative than consensual organization (Chapman 2003). One would expect differential access to goods, disparities in housing, richer and individual graves, and both individual *and* central storage. Again, the degree of authority and the range of what leaders regulate are less strong, less extensive, and less permanent than in a more complex society. They still governed

predominantly through coordination. However, social heterogeneity becomes apparent in this form. Cahokia (DeBoer 1988) discussed above fits here.

Stratified, Regulated Societies

The specific coordinating or regulating role of the leadership very much depends on the strategy of the leaders and the nature of communal needs. Blanton et al. (1996) and Feinman (2000) capture this aspect in their concept of dual evolution. A “corporate strategy,” even in a situation with authority ranking, tends to favor the good of the community over that of the leadership group. In an “exclusionary strategy,” the opposite is true. Often the exclusionary strategy involves a network strategy, in which leaders build a system for enhancing their wealth and status based on controlling high-valued goods from outside the local community and controlling the flow of goods within their polities. One way to create a network strategy is to gain regulatory authority over craft production. Certainly, as opposed to horizontal egalitarian systems, the mobilization of workers/labor from a multisite ranked system involves creating a bounded polity, as opposed to an open-ended kinship network. Storage tends to be large and centralized, on the one hand, and individual or group, on the other hand. Heterogeneity is at its maximum in this kind of society. Surplus production is important. The southern Mesopotamian case discussed by Adams (1981) fits here.

Storage then is really about the value of things produced for use or exchange. Differences in what is stored, where, and by whom (were there, for example, surpluses?) is a different kind of scale for looking at trajectories of change. The various means of accounting for and therefore perceiving stored goods and their movement is the other key. The types of storage correlate with the variation kinds of organization, and ultimately are reflected in cultural beliefs and practices. They reflect differing degree and distribution of social control. Modifying Smyth’s scheme (Smyth 1989: [table 3.1](#)), some of the correlates of the storage and social structure I propose are as follows in [Table 1.1](#).

Storage then represents the organizational basis of production, as well as the political aspects and degree of heterogeneity of a given social system, its basic structure. How then can we use these concepts in the interpretation of actual cases? The individual cases illustrate this, and in [Chapter 14](#) the editors discuss it.

Table 1.1 Correlation of Organizational Type and Storage

Horizontal egalitarian structure

- Public storage units associated with household units
- Redundancy in the kind of storage
- Mostly foodstuffs

Vertical egalitarian structure

- More individual storage units associated with houses
- Some variation in size and content
- Possible communal food storage

Ranked structure

- Individual and smaller public storage features
- Limited content per unit
- Can be associated with public or specialized buildings
- Food and craft materials

Stratified regulated structure

- Larger than communal storage facilities
- Large central storage units associated with public institutions
- Diverse forms of public and private storage
- Individual units associated with domestic units
- Food, craft, ritual storage

There are caveats worth noting. We must as social scientists understand that even as useful as storage behavior is, it makes evolutionary sense only in the broader context. Archaeologically, we must be careful in our interpretation. Horne (1994) in her ethnoarchaeological analysis of a village in the Tauran area of Iran, shows that each family had a storage space, but she found that not every family's storage space is within their own house. The assignment of rooms within the village can be variable and temporary.

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VERIFYING THE ROLE OF STORAGE: EXAMPLES FROM PREHISTORIC ANCIENT MESOPOTAMIA¹

Mitchell S Rothman and Enrica Fiandra

Introduction

As argued in [Chapter 1](#), storage is about controlling goods that people produce for later use or redistribution. It is about integrating the labor, production, and subsistence of people, all within differing kinds of societal systems. These systems utilize storage as a primary mechanism for accomplishing different types of integration, from horizontal egalitarian to vertical egalitarian to ranked and ultimately to stratified and centralized. Evolution then is visible in the ways these systems change as the underlying organization changes, and in the Near East and elsewhere as in some places it moves toward centralized and formally administered systems.

Most ancient societies do not yield physical evidence of the associated control mechanisms. Greater Mesopotamia from the seventh to the second millennia BC is an exception. We contend and demonstrate that where we do have independent evidence of control systems—seals, sealings, and storage spaces (Frangipane 2007a; Rothman 1994a, 1994b; Fiandra 1981b, 1982; Ferioli and Fiandra 1983, 1993, 1994; Fiandra 1983a, 1983b, 1994)—we can see how societal structure and change correlate with storage practices.

The System of Seals and Storerooms

This sealing mechanism represents two parts of the control process. First, seals and their clay sealing locks are a means to limit (control) access to the sealed rooms, pots, baskets, sacks, and so on (Rothman 1994b). The sealing design represents individuals or offices. For seal users the impression is like a signature (Rothman 1994a). Those who view the design will know whether they have the right to access the sealed contents, so that second, when removed the clay sealings then can constitute a receipt for auditing ([Figure 2.1](#)).

The evolution of the seals from stamp to cylinder seal to tablets represents a need for additional information and to deal with people

who do not have a face-to-face relationship, reflecting greater societal scale and organizational complexity (Rothman 1994a, 1994b; Nissen 1977; Winter 1987). The second part is the auditing function of seals and sealings (Frangipane 1994; Rothman 2007). From the stage when ancients used tokens to count kinds of goods (Schmandt-Besserat 1992) to the time of sealing and after that to tablet use, auditing was one of the modes of control. We know about the auditing function of sealings best from Arslantepe and historical periods (see below).



Figure 2.1 A seal (3–605 from Tepe Gawra level X) and a sealing (6077 from Tepe Gawra level VIII). Photograph by Jay Carl Rothman.

Clay sealings constitute homogenous groups related to the same organizational contexts, whether they are individuals or those involved in the redistribution of goods in storerooms or storehouses. When societies develop formal administrative systems, seals and sealings form the spine of economic management of those centralized systems. The functional necessity of recording, archiving, and accounting is the same; only the administrative instruments change (see knotted counting strings [*quipu*] preserved even to today in Peruvian villages; [Chapter 8](#), this volume).

Especially important for the more complex societal organization is understanding the use and control of storehouses and what sorts of goods are stored in and redistributed from there. To confirm the classification of storehouses from periods before writing, it is useful to analyze literary texts of the early historic period. A few written documents related to the structure and functioning of storehouses in general and particularly those housing food during the second millennium BC mention the name of the storehouse from which the goods were extracted. Administrators wrote these texts inside the storehouse and preserved them in an office adjacent to the storehouse. This is why we must know the exact location of the archive.

Storehouses stock a variety of goods for redistribution. Sumerian

texts refer to generic storehouses. In modern translations, if the disbursement of barley from the storehouse was mentioned, translators refer to the term *storehouse* as a *granary*. However, the same Sumerian word can be used for a place where the disbursal of cloth or liquids was conducted, even sometimes clearly the same building as the granary.

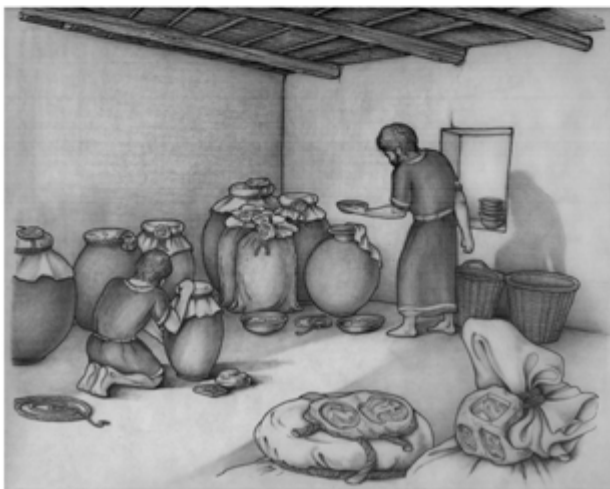


Figure 2.2 Storage units at (a, top) Festòs and (b, bottom) Arslantepe (Drawing by Tiziana D'Este from archive of Missione Archeologica Italiana Orientale [MAIAO]).

At the same time storehouse covers at least two categories of buildings. Some are smaller buildings suited to a rapid disbursal of goods (Figure 2.2). Storehouses are the final stage in dispersal while

warehouses refer to the main, longer-term storage buildings, more concerned with inputs rather than dispersals.

The Sumerian term *ga.nun* seems to mean a complex storehouse. An important *ga.nun* was found in Lagash where, particularly during the Ur III dynasty (nineteenth century BC), it was divided into different parts, one of which may have housed cereals from which rations for workers and animals were extracted. Other parts distributed other goods (Crawford 2013).

The fact that the tablets have been found in different places in the city of Fara does not prove that they are part of private archives, as has been thought, but it attests the existence of different offices of the same administration, adjacent to different warehouses located in various sectors of the city for ease of management. It is therefore evident that administrative centralization is not equivalent to architectural centrality as seen in Festòs and Knossos (Fiandra 1997).

Another type of deposit is revealed by the Ur III texts with the term of *i.dub*, which refers to an accumulation of grain adjacent to a field. The verb *dub* means to concentrate; it may refer to a temporary deposit before the grain is transported to a real granary. It is interesting to note that in the third millennium BC, and afterward in the second millennium at Larsa, the term *è.dub.ba* in the administrative texts means the place where goods are kept (thus a warehouse); *dub* has a meaning equivalent to *kishib* that means seal, and thus the accepted translation should be “house under seal” The term *dub* also has the meaning to accumulate, and thus *è.dub.ba* may mean the “house” where goods were accumulated, or storehouse, as well as where the tablets were written. Normally, this is referred to as the school or house of scribes (George 2005). In the Old Babylonian Period (early second millennium BC), letters from Hammurabi to his land administrator mention an archive of land contracts in Maškan Šapir (Kraus 1968).

The finds in Chantier A of Mari clarify the situation (Charpin 1985). It is a sector with distribution storehouses, registration offices, and archives that still have the tablets related to the receipt of goods, and clay sealings with the same seal impression, which were recovered from the lock of the same door in the house of the fortune-teller Asqudum, probably a high palace official. Dominique Charpin (1985) states that the tablets and clay sealings are analogous to others in other sectors of the palace. So, there are different sectors with decentralized goods that are related through documents to centralized palace offices and archives.

As stated above, the range of stored and restricted access items

varied. In general, clay sealings are not used to protect precious materials, but only where goods were kept for redistribution. Store or warehouses are not “sealed” vaults.

Prehistoric Greater Mesopotamia: Seals, Sealings, Storage, and Evolution

Given the parallel of storage and sealing, what does the Mesopotamian case tell us about storage, social practice, and societal evolution? In the remainder of this chapter, we concentrate on the prehistory of the Greater Mesopotamian north from the seventh to fourth millennium BC. In [Chapter 4](#), Paulette expands on the use of storage in state making during the third millennium.

The environmental context of Mesopotamia is one of different ecological zones and polities of various sizes ([Figure 2.3](#)). The south is an alluvial plain formed by the Tigris and Euphrates Rivers. To its north and east is a progression from piedmont and steppe to hills and then high mountains. We are talking about the modern geographical units of southern and northern Iraq, north Syria, southeastern Turkey, and western Iran, into the Taurus and Zagros mountains. The interaction of groups within and between these different pockets of resources was one of the forces that created change (Algaze 1993, 2008; Rothman 2001b).

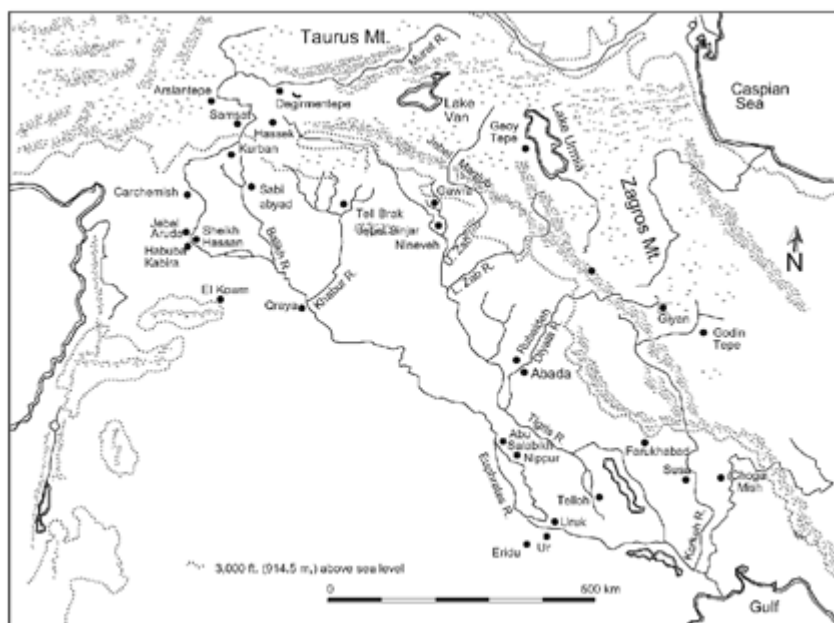


Figure 2.3 Mesopotamia sites in the LC2-5.

The earliest time we have seals and sealings is in the late Neolithic to Halaf Period starting in the seventh millennium BC. The cultures and

societies of this period occupied a number of the different ecological subregions. What is common among them is a broad spectrum of grain agriculture, stockbreeding, and some hunting. They settled, mostly in small sites, and seem to have moved and resettled often, expanding into new areas. A number of sites may seem much larger—for example, Domuztepe—but they could easily represent not contemporaneous, but repeated re-settlements (Frangipane 2007b). Their food production methods were technically simple and did not require intensification, as later Early Bronze Age systems did (Wilkinson et al. 1994). They can be readily readapted to various environments in the rainfall agricultural zone. Craft production of very fine pottery and processing of obsidian complemented agriculture (Rothman and Blackman 2003; Rothman 2002).

We now realize how little we have previously understood about the Halaf economies. Some have suggested mechanisms by which the characteristic painted pottery was distributed among sites across a 600 km latitude, on occasion at some distance from the origin of its manufacture, but our understanding of ceramic and obsidian distributions must now also accommodate dispersals of organic commodities—plant foods, animals and animal products, oils, fibers, hides, fodder, even dyes and medicines. [...] From this point of view, it is critical that we understand the range of variability in Halafian economic adaptation—in this case, how the Halaf was economically structured both in the dry-farming optimum at Tell Aqab and at its geographical periphery at Umm Qseir. (McCorriston 1992: 330)

Frangipane (2007b) sees the social structure at the core of Halafian society as horizontal egalitarian (see [Chapter 1](#)). Central storage at sites like Sabi Abyad (Akkermans and Verhoeven 1995) and Arpachiyah (Campbell 2000) reflects the equality sharing relationships at the heart of this type of organization. For a societal system dependent on rainfall agriculture, always uncertain, storing and distributing grain among many small communities became a key to survival and expansion. Cattle rearing was both a secondary and an alternative source of calories (Campbell 2000). The only goods found consistently in these burned storage buildings were large quantities of grain.

A number of factors confirm the relation of the economic system to social structures. Funerary practices show no sign of rank and vary widely, reflecting no ideology of inequality or authority. Perhaps the most important evidence of this societal organization is the sealings. At Sabi Abyad they were concentrated in the storerooms. All are from local clays, so these are not imports. Their numbers are unusually high; there are many seals, and their designs fall into a limited number of oft-repeated designs. This indicates that all the residents

participated, and no one had greater access or control (Akkermans and Duistermaat 1997). The picture is of a set of possibly kinship-related groups sharing a central facility and withdrawing grain as needed. It is a society, as Flannery (1993: 110) writes, “in which risk is assumed at the level of the group” To summarize:

The Halaf society, taken as a whole, appears to have been a society of equals, resulting from the integration into the Syro-Iraqi Jezira region of different older traditions borne by various communities probably from different origins. [...] Both the communities which occupied the plain and the hilly steppes in this wide region in the course of the seventh millennium and the later Halafian communities [...] probably practiced a subsistence economy based on cooperation between different groups. (Frangipane 2007b: 163)

Mesopotamian society evolved beyond the horizontal egalitarian mode of organization by the middle of the fifth millennium BC. Some cultural indicators remain the same. For example, there is little variation in graves to mark ranking in ideological terms. However, the large-scale spread of ‘Ubaid culture compared with the preceding Halafians hints at one of the major changes. The onset of irrigation agriculture and the growth of specialist nomadic pastoralist populations changed the environmental conditions to which local populations adapted. The risks for individual families declined, but population and competition increased, creating new risks and selecting for different organizational structures. This competition is apparent in the violence evidenced at transitional ‘Ubaid/Uruk Tepe Gawra XII and XIAB, both of which ended in fire and with the skeletons of slaughtered individuals in the entry road (Rothman 2002). Surplus grain was available, and craft production and systems of exchange created demand and selected for a degree of labor specialization.

The results of these changes created vertical organizations. For example, at Tell Abada in the Diyala River Hamrin area there was one house that was five times the size of the smallest house (Stein 2010; Jasim 1985). That house had a higher concentration of goods that would seem to mark higher rank; for example, maceheads and palettes made of rare imported material. In general, domiciles, however, were of similar form, and they were of a larger size than the Halafian square or *tholos* forms, suggesting that extended kinship may have been a residential unit.

Tepe Gawra

This pattern is even clearer at Tepe Gawra in the piedmont of

northeastern Iraq. Excavators cleared the full Gawra mound from the top to level VIII, and as the mound widened, they still exposed a full half of the mound by level XII (Rothman 2002). The pattern of equality sharing and vertical egalitarianism is clear in XII in the transitional 'Ubaid-Uruk late fifth millennium BC period (LC1). As [Figure 2.4](#) illustrates, the site consisted of a series of tripartite buildings. Each evidenced access to goods, including exotic goods (Rothman 2001a), and a full range of domestic and productive tools. The largest, the White Room building ([Figure 2.5](#)), is often cited as a public building. It is larger, has more storerooms, two with remains of door sealings, and a large percentage of in-context sealings. At the same time, it, too, has the same basic set of domestic goods as each of the other tripartite buildings, and excavators found both seals and sealings associated with these other buildings, as well. This leads to the proposition that it was the house still of an extended family, but possibly one whose members coordinated but did not regulate activities of others on the site (see [Chapter 1](#)). The White Room family shared goods with other members of the community. Another indicator of this equality is graves, which are very similar and show no evidence of differential status (Tobler 1950).

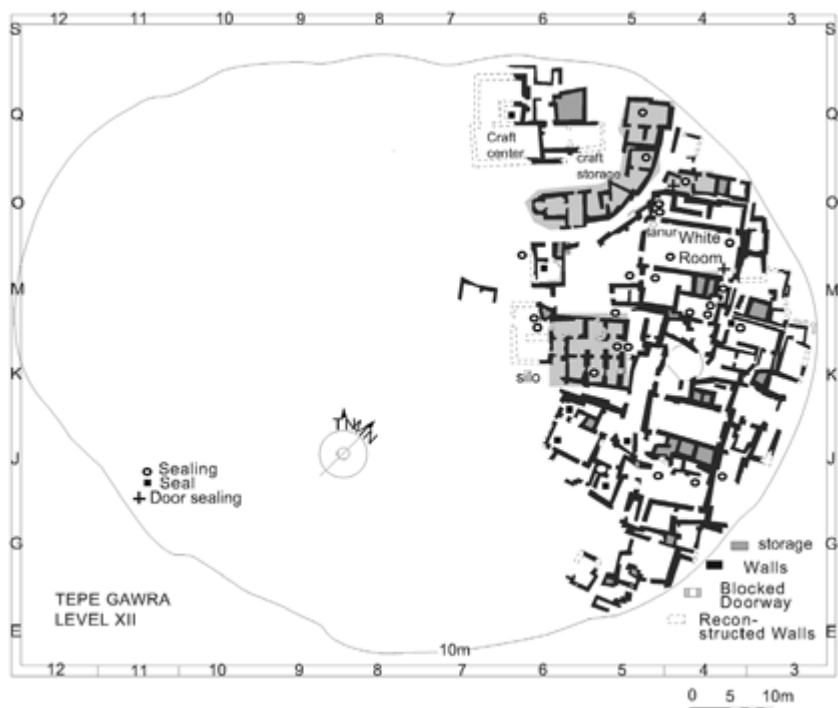


Figure 2.4 Storage units in Tepe Gawra level XII.

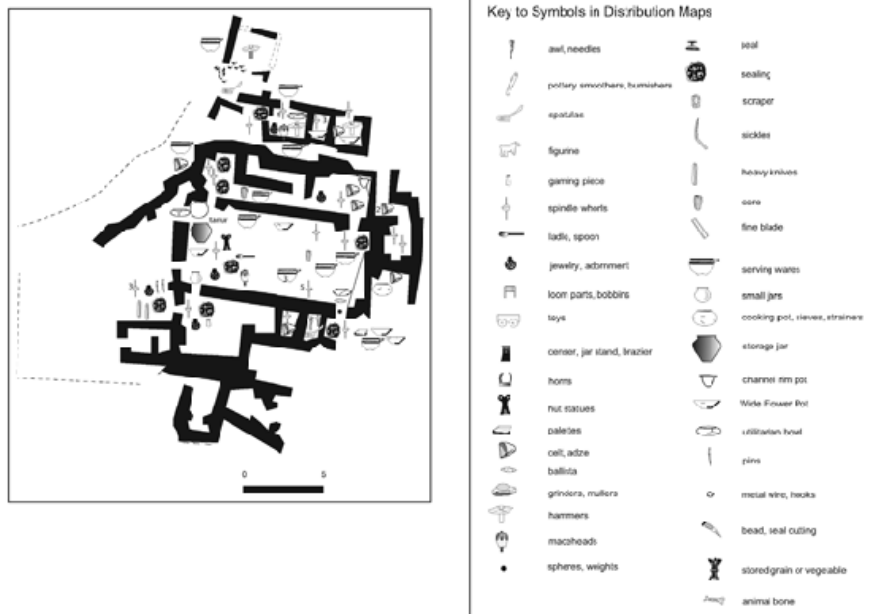


Figure 2.5 The White Room building of Tepe Gawra Level XII.

What is distinctive at Gawra XII, in addition to each of the storerooms from each of the houses, are two larger public storage facilities, a grain silo, and a series of small storage rooms by the entranceway to the mound, and a building that seems like a craft production center (see Figure 2.4). The proximity of the White Room building to the craft storeroom, sorting bins, and possible craft production building could indicate that its residents had some increased rank, but that is conjecture at this point. Interestingly, there are religious artifacts such as hut symbols (see Rothman 2002: 64–66) and images of shaman-like creatures on seals and sealings, but unlike the southern ‘Ubaid sites such as Eridu, no formal temple buildings existed in Gawra XII or the following Gawra level XIA/B.

What is different from Halafian sites is the scale and nature of interaction within and without the system. Neutron activation analysis (Rothman and Blackman 2003) of two categories of fine wares, sprig and impressed ware, indicates that they were being traded over a wide stretch of the Jazira from the modern border of Iraq and Turkey near Dohuk (the site of Shelgiyyah) to the site of Tell Brak in the Khabor basin to the west. Sealings of this period came from clay near Gawra but also from foreign sources, implying that trade was to some degree controlled (Rothman and Blackman 1990). This practice is evidenced by later clay sealings located in the Louvre Museum, related to the Ur Emush seal (Fiandra 1981a). Those with the seal impression of the transported container came from Kish, and those with the door closure

came from Lagash, where the official had his storehouse. Other commodities found at Tepe Gawra like obsidian, gold, and lapis lazuli also had distant sources (Wright 1969). Obsidian from the 4c source around Lake Van appeared at Gawra, but also at Eridu in the farthest south. Relatively large-scale production of metals occurred at contemporaneous Değirmen-tepe, a site with tightly packed houses similar to Gawra XII (Gurdil 2010).

In a sense, this period marked a new scale of interaction in which people became part of networks of long-distance exchange of craft goods and exotic raw materials. Specialized production areas appear at sites like Gawra XII. Violent competition also emerged, as is evident by the burning of Gawra XII (Rothman 2002). The social organization appears to be an equality-sharing one, likely one with some nascent vertical egalitarian organization. At the same time, one could not call it administrative. As predicted by the model (see [Chapter 1](#)), it had both private and communal storage. In addition, the possibility emerges, only speculatively at this time, that Gawra became a center relying on grain coming in from outside the site, as the grain storage silo had many clay sealings, and the potential amount of grain stored appears larger than the needs of the site's population (Rothman 2002). Surpluses from whatever source, whether used for redistribution to groups outside the site, for specialized activities like feasting, or as a hedge against a future shortfall, signaled a new kind of organization needed to integrate a larger, more heterogeneous interaction sphere.



Figure 2.6 Tepe Gawra Phase XI and workshops.

A few hundred years later in the XI Phase at approximately 3900 BC, Gawra level XA/XI evidences a new pattern ([Figure 2.6](#)). A relatively small number of houses with less living area than in XII appeared alongside three or four specialized buildings. They include a public administrative building; two specialized workshops, one for

weaving (Figure 2.6) and the other for stone and woodworking, as well as, for the first time, a formal temple. The sealings and seals appear only in these specialized institutions and are made only of local clays. This pattern fits the model of Kowalewski et al. (1983). Their model proposes that in the period of early regulation systems are “closed,” that is, concentrated more on control of elements in the local system than relations with the outside world. A concentration on local products, especially food, would be evident. That the doorway to the temple faced out onto the surrounding plain (in succeeding levels it faced inward to the center of the mound) might signal a new kind of societal organization (Rothman 2002). It represents in theory an attempt to integrate the local population into Gawra as a small center; the only entrance to the Iranian highlands through the Jebel Maqlub is close to Gawra to the east, and thus places Gawra on the modern route for pastoral nomads and traders. Leadership does not appear to have been particularly centralized. Distinct sets of themes on the sealings associated with the temple versus the administrative building and workshops indicate some kind of division of control mechanisms (Rothman 1994a). Storage in this level is completely associated with individual buildings or institutions. There is no communal storage evident.

Three hundred years later at 3600 BC, Tepe Gawra level VIIC-A represented another structural change, moving toward greater centralization and leadership within regulatory institutions (Figure 2.7). The beginning of a more formal international exchange system, called the “Uruk expansion” (Algaze 1993), dates to this time (3600 BC). Exporters from the resource rich highlands of the north and east shipped metals for tool making and display, chipping, precious and semiprecious stone, logs, and potentially other goods south to the emerging cities of southern Mesopotamia (Algaze 1993; Rothman 2001b). A huge increase in the finds of obsidian blades, mostly unused, indicates that the residents of Gawra at this time were participants in this trading system.



Figure 2.7 Tepe Gawra Level VIII, Phase VUIb and Villa temple.

Further, the three phases of the VIII mound, completely excavated, had very few houses (see Figure 2.7). A two-story administrative building with living quarters, a temple, a central storehouse, a comptrollers' house, public building, corrals (VIIIA, the latest), and other specialty manufacturing areas dominated the site. There can be little doubt that the site had become a center, theoretically for a population in the piedmont between the Upper and Lower Zab Rivers, and possibly mobile, pastoral populations moving through the Jebel Maqlub. The misnamed Western Temple was a grain storage and redistribution center, a storehouse. Excavators found “decimeters of grain” (Gawra fieldnotes) with piles of utilitarian bowls like the beveled rim ration bowls of the south in its large southern room (Rothman 2002). The central storage building, a warren of small rooms, contained tools and manufactured items in doorless spaces that administrators reached with ladders set up in a narrow, easily secured alley outside the southern wall of the storeroom.

The seals and sealings confirm the central coordination role of the Gawra center's administrators. Again, foreign clays appeared among the sealings. Excavators found one particular repeated design from the same seal (Figure 2.1), the bull, dog, and snake (Rothman 2002), which appeared in each institution, most in the area of what we interpret as the comptroller's house. Excavators recovered pieces of the exact same sealing, with one piece in the comptroller's area and the other in the temple, like a modern perforated receipt. All were preserved in good context, as the level VIII burned in a natural fire or was intentionally burned—it is not clear which—ending this phase of the site's existence. Graves showed distinct stratification in form and contents, which corroborates the changes in structure from a more vertical egalitarian to a ranked society (Peasnell 2002).

The conditions to which the residents had to adapt were the problem of feeding a larger polity population, including specialists, integrating this partially settled and partially mobile population, in addition to coordinating manufacture and trade in the international trading system. Agency and the opportunity for self-promotion no doubt played some part in this increasing complexity and probably more heterogeneous population.

After Gawra VIII burned in 3600 BC, rapid social change occurred in Greater Mesopotamia. The trend of this evolutionary trajectory was the establishment of complex, heterogeneous, socially differentiated, administratively organized societies—that is, the state—in the period from 3500–3000 BC.

Arslantepe

This trend toward greater societal complexity in an environmental setting not that different from Gawra was Arslantepe, especially level VIA (Figure 2.8). The site is in a rich highland area, less circumscribed than the mountainous valleys to its east. Unlike Gawra, tucked up into the piedmont hills, Arslantepe's chief locational asset was its position on trade routes from all directions: through the Taurus highland along the Murat River or across the northern edge of the Taurus massif moving west, down the Euphrates River moving south and north, as well as a limited set of mountain passes from the Anatolian central highlands heading east. The largest copper mine in Greater Mesopotamia, Ergani Maden, was not far away. Goods moving north to south into core Mesopotamia were likely to pass through Arslantepe.



Figure 2.8 Arslantepe temple-palace complex with storerooms.

Based on the evidence from Arslantepe, it is possible to determine the following:

- (1) The functional characteristics and the type of room used for the administrative operations.
- (2) The archival and accounting nature of the various groups of clay sealings kept as proof that the operations had been completed. The way used clay sealings were grouped in disposal seems to be planned from the very moment they are

collected. This auditing operation took place in the storerooms.

(3)

The number and positions of the officials involved, whether directly or indirectly, in the administrative operations of redistribution in which clay sealings were used.

The storehouses and deposits for this purpose have architectural characteristics that do not distinguish them from other spaces for other purposes. But they have a common characteristic; they are accompanied by spaces devoted to archival purposes where the materials that represent the documentation of the administrative control periodically are placed.

Before writing, these spaces act as archives where “documents” represented by the clay sealings with elements that represent the administration of goods during a particular period are preserved. Afterward, when writing is present, the archives preserve written texts related to the transactions and withdrawals of goods, and after this, even texts that record operations monthly or for a different period.

The conventional term of *storehouse* responds well to its function as it is the place where different kinds of dispersal were happening. Some is from large storage jars; the other room seems to have contained the items in question loosely.

The site was a primate center in its area with satellite sites at some distance away (DiNocera 2005). Therefore, the storage system was a major part of this trend toward centralization (Frangipane and Palmieri 1983; Frangipane 2001, 2007a, 2010). The storage rooms were off the main corridor of a long-lived temple-palace complex that served as the administrative center of the large town. Still, while larger than Tepe Gawra, in no way is Arslantepe at the same scale as sites like Uruk (see below). One room was locked from the outside to protect its contents, the other had large storage jars that were covered and sealed. As mentioned above, excavators recovered sets of sealings in an abandoned room. The shape of each clump was convex, as if an auditor had counted them, dropped them in baskets, and then threw them out in place. Excavators also found primitive counting tablets with impressed holes but no signs. We know little about private houses, productive activities, or mortuary practices, so the broader social structure is hard to assess, but the institutional storage system is typical of a more clearly stratified society. How much more administratively elaborated than was Gawra VIII is hard to say. Its probable role in intraregional exchange, the Uruk expansion, and integration of a far-flung population would suggest that the conditions

selected for a more stratified, centralized system.

Still, the administrative system at the site was one of staple finance locally with an export system regionally. Culturally, the local leadership maintained its position in part by resisting the cultural influences of southern Uruk culture, while asserting local control, and integrating a dispersed population.

Uruk-Warka

One of the clearest cases for the development of the most complex of the social structures described here for the fourth millennium BC was the city-state of Uruk (Warka). We know it more from texts than from the actual archaeology, and we know a lot about the architecture of the central walled precincts of Eanna and the nearby Anu Ziggurat (Nissen 2001). We know little in detail about the artifactual remains in situ or about areas outside Eanna (Nissen 2001). Texts provide a detailed look inside the Uruk administrative organization. The Professions List makes the creation of a hierarchical system clear (Nissen 1986). A school text meant to copy words scribes would need, the Professions List from Uruk enumerated separate offices, “leaders” and subordinates, elements of a classic bureaucracy. Hundreds of the accounting tablets with the earliest writing found in Eanna were mostly lists of receipts into and disbursements from central storage. The *Riemchengebäude* had stores of imported goods (Forest 1999), although I suspect the grain and food stores discussed in the tablets must have been elsewhere on the mound. As at Gawra XI, administrative (the palace) and religious (the temples) organizations, the central institutions, were somewhat separated.

At Uruk and other southern city-states, each institution controlled its own fields, produced foodstuffs, and kept them in associated storage areas (Sterba 1976). Tribute or taxes came into the central stores, as well. The scale of the site is unlike any of the other sites discussed here; the population of Uruk was approximately twenty thousand, mostly not farmers. This scale and (from later texts) the heterogeneity of groups and institutions selected for a hierarchical administrative system that could integrate these groups, provide food for laborers and citizens in times of crop uncertainty (see [Chapter 1](#)), and control of international trade. Its bureaucratic players were clearly self-promoting, establishing a formal role through agency. Unlike Arslantepe, whose role in the Uruk expansion was most likely export, the focus at Uruk was more on imports. The uncertainty of agriculture, the lack of raw and finished materials locally, the ease of transport through a series of canals (Algaze 2008), the density and

heterogeneity of the population, extent of economic demand, and probably competition with other local city-states selected for, or at least permitted the evolution of centralized, socially differentiated, regulatory systems.

As Paulette ([Chapter 4](#), this volume) demonstrates, this evolution toward greater scale and more centralization, if also with greater internal competition, expanded over the next millennium and a half.

Conclusion

Prehistoric Mesopotamia, as outlined above, certainly illustrates an evolutionary trajectory from horizontal egalitarian societies to stratified states. The storage of grain especially, but other goods, as well, reflects this developmental trend. From the earliest example, some kind of sign-in procedure was utilized to confirm and record the identity of persons depositing and withdrawing grain from the communal storehouse (in a sense, this was more a warehouse, as it was the sole long-term storage area). Throughout this trajectory, seals and sealing use was a practice that reflected the increasing control, from a signature of a person equal in the community to an office, which had the authority to control what was brought in and to whom and for what purposes it was withdrawn. The structure of those who controlled the storage and warehouses through the use of seals and sealings apparently reflected the general political system of these earliest states overall, whether in the recruitment of labor for central, mass-productive workshops for cloth or for military campaigns.

The model summarized in [Table 1.1](#) of [Chapter 1](#) does work to describe the evolving social organization of Greater Mesopotamia from the seventh to the end of the fourth millennia BC. It promises to work for other regions and times ethnographically and archaeologically.

The question it raises is why do these changes happen? We have had a tendency to concentrate on dynamic models of the structure (Stein and Rothman 1994) or adaptation, rather than the interplay of social structures and the specific stressors or forces in the natural and human environment that cause change. In this case, agricultural uncertainty, the ability of agricultural regimes to intensify production for surpluses, changing scale measured in population and geographical size, and craft exchange over greater distances, all aspects discussed in the current literature were factors. We still need models of integration that will truly explain how these factors lead to specific results.

The Mesopotamian case also demonstrates the insufficiency of

unilinear models of evolution and of step models. Four general kinds of social relations identified above include horizontal egalitarian, vertical egalitarian, coordinated and ranked, and regulated and stratified. In the Mesopotamian case a number of different societies existed *within* each of these categories. These categories should be successful for cross-cultural comparison, but greater specificity is necessary to understand change within any society's evolutionary trajectory.

Notes

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ON SOME POSSIBLE IMPLICATIONS OF A NEWLY DISCOVERED EARLY BRONZE AGE, LARGE-SCALE SILO COMPLEX AT AMAZIYA, NAHAL LACHISH (ISRAEL)

Ianir Milevski, Eliot Braun, Daniel Varga, and Yigal Israel

Introduction

Researchers on the region of the northern Negev suggest that during the Early Bronze Age I the region was occupied largely by small agricultural communities.¹ At most of those settlements storage facilities (presumably for grain) were small and obviously geared for private consumption associated with individual domestic units. However, a village at Amaziya and another at Lahav differ in that they were associated with clusters of much larger storage units (also presumably for grain) with capacities that obviously far exceeded the needs of occupants of those sites. Such installations suggest that, contrary to the prevailing social paradigm at most communities, those sites were associated with a different type of social organization involving some degree of centralized control and a redistribution system. This was likely catalyzed by interaction with one or both of two large communities in the region with associations to what is believed to be Egyptian colonial activity in the southern Levant.

Amaziya: Location and Finds

In 2010 and 2011 the Israel Antiquities Authority conducted two extensive seasons of salvage excavations at Amaziya (Duweimeh) on the southern bank of Nahal (*wadi* or seasonal water course) Lachish. The site is located about nine kilometers east southeast of Tel Lachish (Israel grid reference 191850–605050; Google Earth map reference 31° 32'16.46N /34° 54' 43.15") (Figure 3.1), in the south Judean Shephela (piedmont of low hills and narrow valleys), on a hill with limestone outcrops; its summit, about 390 miles above sea level, lies at around sixty meters above the surrounding wadis. Amaziya, and the excavation site, is strategically situated between two major geographic zones, the northernmost extension of the loess plains of the northern

Negev and the western edge of the southern Judean Incline. To the west lie major ancient settlements along Nahal Lachish, the northernmost reaches of the Negev (which extends far to the south), and beyond, the low-lying Mediterranean Littoral. To the north is the central Judean Shephela, which to the south gradually tapers off with the Judean Incline to merge with the Negev. The Eocene hills in the area of Amaziya and adjacent alluvial valleys (Picard and Golani 1992) lie between isohyets of three hundred and four hundred millimeters of annual rainfall (Alster et al. 1956: pl. IV/2:a).

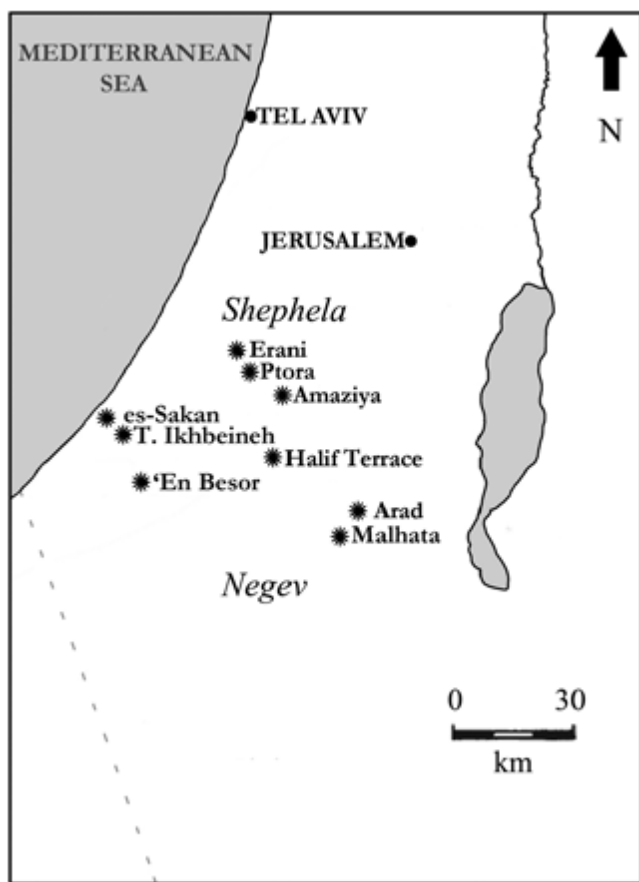


Figure 3.1 Amaziya, location of excavated areas. Courtesy of Yehuda Dagan, Israel Antiquities Authority.

Excavations indicate the site was occupied mainly during the first and fourth phases of the Early Bronze (EB henceforth) Age (i.e., EB I and EB IV) in Areas B1 and B2 and later periods in the other areas (Figure 3.2). This puts the date of the relevant levels at approximately 3600–3000 BC for EB I, 2600–2300 BC for EB III, and 2300–1950 for EB IV. Although architectural remains of the EB Age are restricted to Areas B1 and B2, pottery from that era was also found in Areas C and

D, which includes finds dated to EB III.



Figure 3.2 Amaziya, aerial view of Area B2, facing south.

Areas B1 and B2 are on the northern slope of the site, between two smaller, seasonal water courses that debouch into Nahal Lachish. There, two precincts devoted to different functions were unearthed in a large exposure, a domestic area with house foundations and adjacent installations (Area B1), and a nearby large-scale complex of subterranean, circular silos (Area B2).

Description of Area B1: Domestic Structures

In an exposure of about 1,250 square meters, in this excavation precinct on the lower northwestern slope of this natural hill ([Figure 3.3](#)), we found a group of rectilinear rooms, several small, circular stone-lined pits (silos?), and a constructed corridor leading to natural cave complex with several cavities linked to one another by narrow passages. While evidence of several phases of occupation was discerned in this area during excavations, its final stratigraphic profile remains to be fully reconstructed after completion of the study of associated material culture remains. It is, however, possible to note at present that the major phases of occupation of Area B1 date to EB I and EB IV. The earliest remains of domestic architecture are dated to EB I, as is the evidence for earliest utilization of the cave. However, most findings from the cave complex indicate its latest use was for olive oil production and the processing and storage of grains and/or

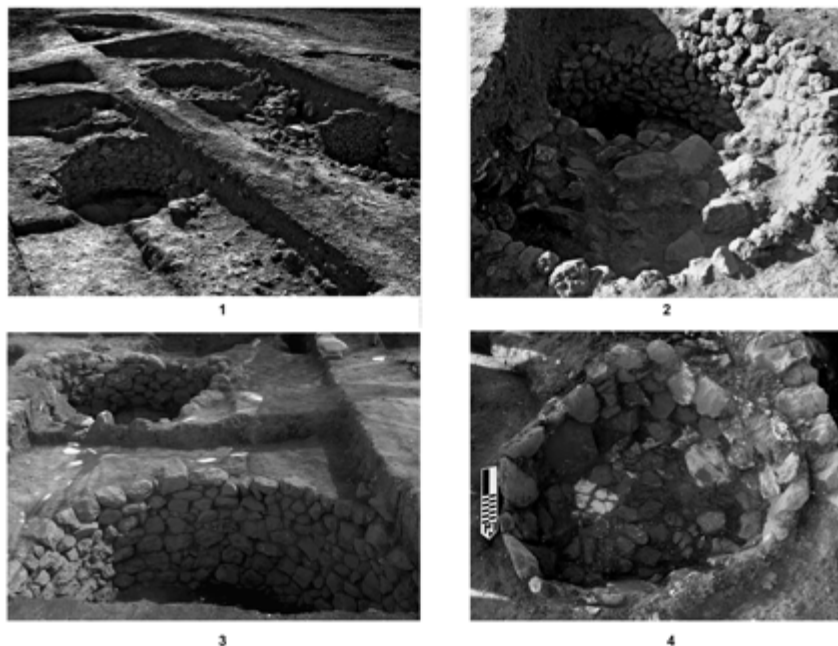


Figure 3.4 Amaziya, closer view of storage pits.

The silos, unearthed over an area of about five hundred square meters, were arranged in horizontal rows parallel to the natural slope of the hill; others may lie buried in adjacent unexcavated areas to the south and east, which, for lack of time and resources, could not be explored. The structures uncovered to date are considered to be part of a large-scale complex of silos purposely located but deliberately set apart from the adjacent residential sector of the EB I occupation in Area B1. The two areas were separated by an unoccupied, open space about ten meters wide.

All the silos were constructed of fieldstones without stone pavements. Those belonging to the early phase range from 2.6 to 3.0 meters in their maximal (upper), preserved diameters and 2.4 to 2.8 meters at their bases (Table 3.1). Those from the late phase were considerably smaller, ranging in their diameter from 0.8 to 1.1 meters (reconstructed depth 0.4 meters). We assume that portions of the walls of the large silos originally stood to a greater height and, thus, were probably visible aboveground. The upper portions of their walls collapsed into the silos (see, e.g., Figure 3.4, [2]), giving the average reconstructed depths of the silos measurements between 1.8 and 2.00 meters. Reconstructed depths (Table 3.1) were calculated from the quantity of fallen stones found during excavation of the silos.

Table 3.1 The Silos Compound

<i>Loci</i>	<i>Squares</i>	<i>Stone type</i>	<i>Diameter maximum/minimum (m)</i>	<i>Reconstructed depth (m)</i>	<i>Reconstructed volume (m3)</i>	<i>Weight of stored grain (kg)</i>
1762	L13	B	3.0, 2.8	2.0	13.2	
1761	K12, L12	A	2.6, 2.4?	1.8?	8.8?	
1742	L12, L13	B	2.9, 2.6	1.8	10.7	
1769	M11, M12	A	2.6, 2.4?	1.8?	8.8?	
1752	M12, M13	A	2.9, 2.7	2.0	12.3	
1732	N12, O12	A-B	2.9, 2.5	1.8	10.3	
1795	O10, O11	A	2.8, 2.6?	1.8?	10.3?	
1739	O12, P12	A	3.0, 2.7	1.8	11.5	
1728	N13, O13	B	2.8, 2.6	2.0	11.4	
1767	P12	C	0.8, 0.7	0.4	0.2	
1721	O13	C	1.1, 0.8	0.4	0.3	
S/N	P11, Q11	A?	?	?	?	
S/N	N14	A?	?	?	?	
Total					97.8	64.46

Ancient residents of Amaziya excavated the large silos in the natural rendzina soil, arranged in precise rows and aligned with the natural, sloping topography. All those features were constructed of natural fieldstones laid in successive courses with no evidence for the use of any mortar or plaster between them. Floors of the silos were of the same rendzina soil or, in some instances, of underlying bedrock.

Construction techniques distinguished within the excavated silos are expressed in preferences by their builders for two different categories of fieldstones (Table 3.1). One group of silos was fashioned from unworked, naturally rounded stones (Type A, e.g., Figure 3.4, 2), while a second group showed a preference for somewhat larger and more angular fieldstones (Type B, e.g., Figure 3.4, 3). The upper portions of several silos were built with Type B stones, while their lower and medium courses were built of Type A stones (Figure 3.4, 2). The distinction possibly suggests a rebuilding of upper phases of those silos and even a slight chronological distinction in some instances. Alternately, the different stone types could be expressions of other considerations, which remain obscure. Silos of the later phase, built of

even smaller fieldstones, Type C (e.g., [Figure 3.4](#), 4), also dry bonded, were paved with the same type of stones.

While nothing was found within the silos that would indicate their definitive functions, analogous subterranean structures from many periods and places indicate their likely purposes as grain stores (Pfälzner 2002). A projected study of soil samples from within the pits at Amaziya will, it is hoped, produce evidence of phytoliths to confirm our theory of their functions as storage facilities for agricultural produce placed directly within them, as no evidence for partitions or containers (e.g., bags or pottery vessels) was encountered in the excavation. Although, Pfälzner (2002: 269) has suggested that in some instances storage facilities would have contained sacks of grain, he referred to freestanding granaries and not underground silos. While a large percentage of pottery sherds, typical of Late EB I ([Figure 3.5](#), A) found in fills within the silos at Amaziya is of storage jars (see below [Figure 3.5](#), A.9), they are not believed to have been in situ as there was no possibility of restoring any vessels to even near complete shapes, while the percentage of similar types of sherds is the same for Area B1.

Dating the Silos

Dating of these silos is based on an overwhelming mass of evidence of material culture, mainly pottery sherds, found within them and within the earthen matrix into which they were dug. In addition, the material extracted from the excavation of Loci 1780 and 1781 (the space between two silos, Loci 1732 and 1739, respectively; see [Figure 3.4](#)) indicates a *terminus post quem* for the silos of the early phase, while the material found within the silos of the last phase (Loci 1721 and 1767) gives a *terminus ante quem* for the early phase. Since pottery dated to the end of the EB I was found in both contexts, the silos are dated to that late phase—that is, circa 3000 BC—which coincides with the presence of Late Egyptian Dynasty 0/Naqada III B-C material (see below).

The suggested Late EB I date of the Amaziya silos seems consistent with their association to the adjacent, dated domiciles, and a parallel complex at Site 301 at the Halif (Lahav) Terrace (see below), farther to the south but still within the Judean Shephela (see [Figure 3.1](#) and [Table 3.2](#)). That site yielded somewhat similar structures dating to EB I, albeit constructed of both mud-brick and stone (Dessel 2009: 24, 35, figs. 18a, 18b). Although fewer in number, those at the Halif Terrace² also appear to have been arranged in rows and aligned horizontally along a slope, thus suggesting they were part of a large, centralized

Table 3.2 Comparative Table of Amaziya with Local Sites and Egyptian Chronology

Period	Amaziya Areas B1, B2	Area C	Area D	Classical sites	Egypt	Years BC
EB IA or early EB I	Settlement			Ptoia?, Halif	Naqada III A2	3400–3300
EB IB1 "Erani C"	Settlement, underground facilities	Potsherds	Potsherds	Tel Erani, Ptoia, Lachish, Halif	Naqada IIIA2-B	3300–3100
EB IB2 or late EB I	Settlement, underground facilities, domestic storage, silos, compound	Potsherds	Potsherds	Erani, Ptoia, Lachish, Ziqit, Halif	Naqada III B-C, Dynasty "0"	3100–3000
EB III	Potsherds	Potsherds	Potsherds	Erani, Lachish, Hebron, Ziqit, Halif	Dynasties fourth to the fifth Old Kingdom	2600–2300
EB IV	Settlement, underground facilities, domestic storage		Potsherds	Ziqit, Tel Beit Mision	Dynasties sixth to the eighth First Intermediate Period	2300–2000

Cultural Material Associated with the Silo Complex and Its Dating

Most of the artifacts associated with fills in Areas B1 and B2 can be dated to very late phases of EB I (Figure 3.5, A), a period correlated with late Dynasty 0/Naqada III B-C in Egypt (Braun 2001, 2011a, 2011b). That correlation is strengthened by a small but highly indicative assemblage of imported Egyptian pottery and other, morphologically Egyptian style (i.e., “Egyptianized”) vessels, which could be either imported or of local manufacture (Figure 3.5, B). Although some sherds were in scattered fills and even within the silos, the bulk of the Egyptian and Egyptianized material at Amaziya was found within two large pits, both in Areas B1 and B2.

Most ceramic finds were fragments of medium to large, late EB I, south Levantine type, storage vessels, which is consistent with what is expected at an agriculture-based village, as remains of domiciles and associated spaces encountered in Area B1 indicate the settlement to have been. Notable finds from Area B1 are a small, stone-lined pit, querns, mortars, pounders, and hammer stones, as well as flint tools, including prismatic (i.e., so-called Canaanean) sickle blades and tabular scrapers.

Interpreting Amaziya in Context

The Significance of the Amaziya Storage Complex

If, as our hypothesis suggests, the stone-lined pits in Area B2 (early phase) are indeed large silos used for grains and/or legumes, then they are primary evidence for such activity on a scale hardly

perceived previously in the archaeological record of the late fourth millennium in the southern region. Were the whole site to be excavated, we believe more silos would be exposed. The single exception known to date of a contemporary, analogous storage facility in the region may be at the Halif Terrace, where five silos of a similar, albeit less extensively exposed, installation were found. Its full extent remains obscure, and it is possible that it may have been as large a storage facility as that unearthed at Amaziya.

Differences in the arrangement and sizes of the silos at Amaziya between chronological phases within the complex probably represent variations in storage strategies. The most significant aspect of this organization is that it is opposed to what is known from most other previous and relatively contemporary occupations in the southern Levant (e.g., Milevski 1992: 69–70; Braun and Milevski 1993: 10–11; Levy 2006: pls. 5.9–5.11; Garfinkel, Ben-Shlomo, and Kuperman 2009; Golani 2010). They have limited storage facilities arranged around domestic units. By contrast, these units form a large, centralized complex located within a specialized zone of the settlement, clearly associated with an economic system that dealt with significant surpluses, centrally organized. Such evidence argues for surpluses and an accumulation of wealth (Pfälzner 2002) which must have been under control of one or a group of individuals, who possessed greater access to them. Thus, the implications of this find suggest a ranked as opposed to egalitarian society, a highly unusual social structure for a small, rural, agriculture-based community of late EB I, especially as no great difference in house sizes is apparent at the site. It is therefore reminiscent of other areas, such as the American Southwest, where the symbolic appearance of egalitarianism masks a ranked society (Mills 2000).

As previously stated, which agricultural products were stored in the complex, whether grains, pulses, or some other commodities, remains obscure. However, if the silos of Amaziya contained grain, it is possible to calculate the overall weight needed to fill them and then to calculate the size of cultivated lands needed to grow that many plants (Table 3.1). If only the silos of the early phase that were excavated are taken into account, then, based on the consideration that each cubic meter can store about seven hundred kilograms, something in the neighborhood of sixty-eight metric tons of grain were stored in those silos.

Although traditional, modern Palestinian agriculture yields approximately five hundred kilograms of grain per hectare, the estimate offered here is minimal and most fitting with ancient south Levantine agricultural capacities. Accordingly, a conservative amount

of approximately one hundred kilograms of grains per hectare is suggested for late EB I production capacity, with a corresponding sixty-eight hectares of land required (see Garfinkel, Ben-Shlomo, and Kuperman 2009).

That size of cultivated area is clearly beyond the working capacity of even several village families and raises questions about the socioeconomic structure of the settlement and the silo complex. Who cultivated the lands that produced such large amounts of grain to be stored within the silos? Does that evidence indicate an economic system controlled by a superior entity or is it evidence of a tax or tribute collection system imposed on the inhabitants of the settlement by leadership groups, with elements of a controlled workforce and related logistics?

The silo complex at Amaziya could belong to what Pfälzner (2002: 261–262, 267–272) calls “redistributive mode of storage,” a term borrowed from Polanyi, Arensberg, and Pearson (1957) and Fried (1967) and their redistributive mode of circulation of goods. That mode supposes a centralizing tendency in an economic system, local or otherwise, based on the gathering of agricultural products organized by a political or religious entity. Stored products are utilized by a central institution as exchange goods (e.g., Milevski 2011: 132–145) or as means of supplying other institutions, or as payment for workers or soldiers, or as seeds. This type of redistributive system is associated with pre-state societies.

We do not know whether foodstuffs stored in this facility were redistributed among a specific population or were utilized as means to finance individuals or groups of elevated or special status. Thus, it is difficult to interpret the significance of this unusual arrangement for large-scale storage of foodstuffs, especially as the silos’ storage capabilities obviously superseded likely needs of inhabitants of the site. As there is no evidence at Amaziya or at nearby small, rural sites for the existence of such an elevated class of inhabitants, we suggest the possibility of some sort of economic relations with an external polity and/or polities, for which there are two prime candidates (see below).

If, as may be suggested by the evidence, there was a similar arrangement at the Halif Terrace, then there is a likelihood that the southern Shephela, where these sites are located, was a fertile grain-and/or legume-producing region in Late EB I. Certainly the region’s valleys and relatively abundant rainfall offer sufficient resources for development of such activity (Levy et al. 1997: 3–4).

While it is too early to evaluate the full importance of this

information, it is possible to suggest a likely milieu in which such a system of surpluses could have functioned. The archaeological record has yielded information on two possible candidates for external polities likely to have had economic relations with communities at Amaziya and the Halif Terrace.

Possible Associations with Socially Complex Polities

A large structure with multi-pillared hall at Tel Erani (Kempinski and Gilead 1991) ([Figure 3.1](#)), part of a larger architectural complex, Building 7102, is clearly more than a simple domicile. Its size and plan within what appears to be a very large settlement suggest the likelihood of a public function that may indicate a ranked or perhaps a hierarchical social system consistent with a polity based on a relatively large population in need of considerable food resources. The proximity of Tel Erani to Amaziya and the Halif Terrace makes it a likely candidate for having had economic associations related to consumption of economic surpluses from these smaller communities. Unfortunately, the date of the Tel Erani complex, Building 7102, remains unresolved as the information on it derives from one large-scale excavation that offers conflicting evidence (Brandl 1989) and of another, in an adjacent precinct (Kempinski and Gilead 1991). A date for Building 7102 in late EB I seems likely, although there is a possibility it originated in an earlier phase, sometimes associated with Layer C at Tel Erani (Kempinski and Gilead 1991), which corresponds with early Dynasty 0 or Naqada IIIA (and see Milevski and Baumgarten 2008). A fortification wall at the site may also be related to that same EB I settlement (but could also date to EB III) and thus additional evidence of a ranked society.⁴

Another, albeit somewhat more physically distant, candidate for a consumer of surpluses amassed at Amaziya and the Halif Terrace is an Egyptian colony, apparently with a major base at the large fortified site of Tell es-Sakan (de Miroschedji and Sadeq 2000; Teeter 2011; see also [Figure 3.1](#)) near the Mediterranean coast and its likely satellites at several smaller independent sites and possibly in enclaves within primarily indigenous south Levantine communities. While the existence of this colony, with a complex, hierarchical social organization, does not seem to be in doubt, its extent and influence are a subject of ongoing debate (e.g., Brandl 1992 and Andelković 1995 versus Braun 2002, 2003, 2004a, 2011a: 114–19; in press).

From Egyptianized bullae at ‘En Besor (Schulman 1976, 1980; Schulman and Gophna 1992; see also [Figure 3.1](#)), the Halif Terrace (Levy et al. 1997), and possibly from Tel Erani (bullae purportedly

found in Layer D but without sealings; see Kempinski and Gilead 1991: 171), it is known that an Egyptian polity was engaged in some form of administered economic activity, apparently with local populations in the southern region. Such bullae document Egyptian administrative activity at communities where south Levantine material culture was dominant, but where excavators found considerable quantities of Egyptian associated artifacts, imports, and objects made locally in Egyptian styles. Quantities of similar ceramic artifacts, including *serekhs* (stylized royal insignia) on fragments of Egyptian vessels from Tel Erani, Small Tel Malhata, Tel Ma'ahaz, and Arad, as well as Egyptian pottery from Amaziya, offer evidence of additional economic activity in the southern region, some of it seemingly under royal auspices. In addition, some of that material also made its way into areas farther south (Yekutieli 2004). What is unclear, however, is whether the evidence presently known of Egyptian-south Levantine contacts is indicative of a direct relationship or one through an intermediary such as seems to have been in place at Tel Erani, with its large population, incipient signs of social complexity, and significant repertoire of Egyptian imports (Brandl 1989; Braun, personal knowledge), including a *serekh* of the ruler, Narmer (Yeivin 1960; Braun 2011a).⁵ Although there is a string of campsites along the Sinai Coast from the Nile Delta to the southern Levant, the evidence suggests nothing more than simple trade in Late EB I when the Egyptian colony was founded and thrived (Oren 1989; Gophna 1987, 1990a, 1992; Braun, in press).

Unless the Egyptian colony at Tell es-Sakan (de Miroschedji and Sadeq 2000) brought its own farmers and animal husbandmen to make it self-sustaining, it would have had to rely on either a massive flow of goods from the Nile Valley (for which there is no significant evidence) or on a local hinterland to provide sustenance for its many inhabitants. That it had a large population is suggested by the sizable dimensions of three successive phases of massive mud-brick fortification, which represent a quite significant investment of human labor. Even if Tell es-Sakan's fortifications were created by *corvée* workers of local origin, as Yekutieli (2004), who argues for Egyptians enslavement of locals, might argue, the workforces that created those massive structures had to be fed. That would involve considerable quantities of provender for people and possibly also for beasts of burden.

Tell es-Sakan appears to have been the core, or “mother colony” of an Egyptian colonization effort under royal auspices, and may well have been the gateway for the virtual flood of Egyptian goods that marks a primary zone of activity at specific sites north of Tell es-Sakan

along the southern stretch of the Mediterranean Littoral at the end of EB I (Braun and van den Brink 2008; Braun 2011a). However, EB I sites in those areas were relatively large and had their own significant populations, which may not have allowed them to yield sufficient surpluses necessary to supply an Egyptian colony, although the presence of significant quantities of Egyptian and Egyptianized objects at some of them suggests the likelihood of trade or some other mechanism for the transference of objects. Perhaps such a situation prompted Egyptian activity outside the primary zone of contact between the colony and local south Levantine communities, accounting for the smaller but significant quantities of Egyptian objects at Amaziya, the Halif Terrace, and Small Tel Malhata.

Amaziya and the Halif Terrace in the southern Shephela are in the eastern hinterland of Tel Erani and not so very distant from the Egyptian colony at Tell es-Sakan and its likely satellites at Tel Ma'ahaz (Amiran 1977; Amiran and van den Brink 2001; Beit-Arieh and Gophna 1999), Taur Ikhbeineh (Amiran 1976; Oren and Yekutieli 1992), and 'En Besor (Gophna 1995). Surpluses from Amaziya and other similar sites, such as the Halif Terrace and perhaps even Small Tel Malhata (Amiran, Ilan, and Arnon 1983; Amiran and Ilan 1993), could have supplied one or another or even both those polities. Such stored surpluses could even imply some sort of political control from recipient polities, although the mute evidence of artifacts can only allow for speculation concerning such relationships.

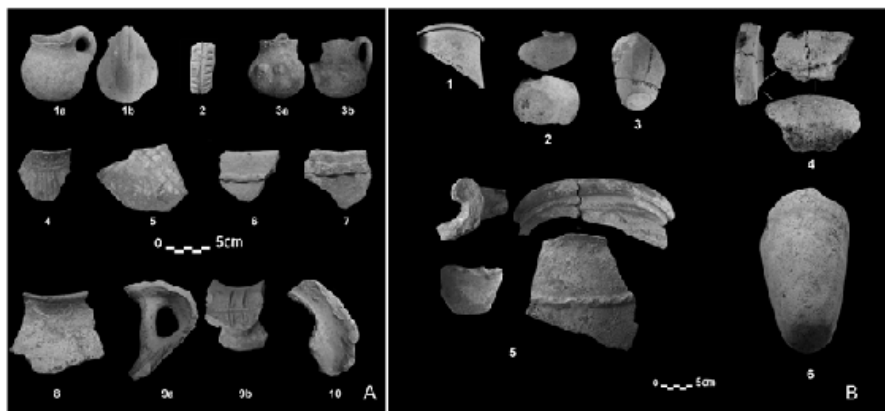


Figure 3.5 (A) Amaziya, local pot types of the EB I from Areas B1 and B2. 1 a–b. Small juglet. 2. Handle, decorated with incisions, “Erani C” horizon. 3a–b. Small juglet with conical protuberances. 4. Small jar painted in the “Basket Style,” contemporary with the “Erani C” horizon. 5. White lime-coated sherd with red crosshatched lines. 6–7. Holemouths with ropelike design, late phases of EB I. 8. Lime-coated jar, developed phases of EB I. 9a. Handle and “cup” for placement of a dipper juglet of a storage jar. 9b. View of the “cup” with incised runnels that channel runoff liquids from the juglet back into the jar; advanced phases of EB I. 10. Ledge handle from a storage jar, “Erani C” horizon. Pictures by Eliot Braun. (B)

Amaziya, Egyptian pot types of the late Dynasty “O,” Late EB I horizon, Areas B1 and B2. 1. Cylinder vessel. 2. Two fragments of small bottles. 3. Lentoid-shaped bottle. 4. Three fragments of a baking bowl. 5. Fragments of “wine jars.” 6. Body and base of a “beer jar.” Pictures by Eliot Braun.

Egyptian and Egyptianized Pottery at Amaziya (Figure 3.5, B)

It is difficult to understand the meaning of the small complement of Egyptian and Egyptianized pottery recovered at Amaziya. It consists of remains of about twenty vessels, none of which is complete. Included are fragments of several “wine jars” (e.g., Figure 3.5, B.5), small and medium-size bottles (for example, Figure 3.5, B.2–3), cylindrical vessels (for example, Figure 3.5, B. 1), and coarse ware bowls (for example, Figure 3.5, B.4) or vats and jars (for example, Figure 3.5, B.6). Four fragments of coarse, heavy baking bowls, sometimes described as “bread molds,” are an unexpected element that cannot be easily explained. These examples of so-called kitchenware are often thought to be evidence of Egyptians residing at a site and practicing their parochial foodways (Sobas 2009). However, these few fragments may be interpreted in another way.

It is also possible that locals were engaged in not only producing grain but also grinding it into flour and perhaps even baking loaves of bread for Egyptians. Such an arrangement might also explain the relatively large cache of baking tray fragments found at the Halif Terrace, which together weighed more than five hundred kilograms (Levy et al. 1997: 307, figs. 7–8). They appear to have been concentrated in a small storage space of irregular plan, mistakenly identified as a “tabun” or oven by the excavators,⁶ but for which there is neither direct evidence nor functional analogies in the archaeological record. That quantity seems an extraordinarily large collection of such parochial type vessels for a typical south Levantine, rural, agricultural-based occupation (Seger 1996; Levy et al. 1997: 34; Alon and Yekutieli 1995; Dessel 2009).⁷ It is similar to Amaziya, albeit with a significantly greater quantity of Egyptian and Egyptianized objects. As Levy et al. (1997: 34) have suggested, that large concentration of baking bowls may well reflect some form of centralized food distribution, which would be out of character for such a community.

Another hint of the significance of those vessels comes from Gophna and Gazit’s (1985) description of thousands of fragments of baking bowls found in association with the Egyptian occupation at ‘En Besor (Stratum III). Although significantly some were unfired and obviously fashioned at the site or nearby, it is difficult to understand why a diminutive site consisting of a single building, which obviously did

not house more than a small complement of people, would yield such prodigious quantities of these vessels, unless they were intended for use elsewhere. We tentatively suggest that Egyptians may have actually produced those vessels for distribution to sites with indigenous populations at Amaziya and the Halif Terrace, who then provided baked loaves of bread, possibly for Egyptian consumers. Notable features of several of the baking bowls from 'En Besor are three different potters' marks on their internal surfaces (Gophna 1990b), which would have left raised characters on the loaves baked in them, making them identifiable to a centralized authority otherwise unfamiliar with sources of production.

Can the four examples from Amaziya be evidence of some similar but far less bountiful production? Once again we may only speculate on what their true significance is, but indubitably it is bound up with the intense Egyptian activity in the southern Levant in Late EB I (see below). Suffice it to note that the presence of these baking bowls does not prove Egyptians were resident at the site, although they clearly indicate some kind of interaction.

The existence of such storage complexes and economic systems that saw surplus commodities going from sites such as Amaziya and the Halif Terrace to larger concentrations of populations, presumably polities with hierarchical, complex social systems, could also explain the phenomenon of 'En Besor, associated with so many bullae fastened to sacks of commodities. That diminutive site seems to have been a way station or depot for gathering and transferring them, presumably to a "mother colony" at Tell es-Sakan farther to the west on the same water course, and/or to its satellites. Bullae at the Halif Terrace and possibly at Tel Erani also suggest direct associations with Egyptian economic activity.

Tel Erani, with its own significant population, and possibly with an addition of an Egyptian element (Brandl 1989), perhaps resident in an enclave within a local south Levantine population, could also have been a possible consumer of surpluses produced at smaller sites in the southern Shephela, or as noted above, could have had a "middleman" status. Such economic activity, trade or even one-sided, forced export/import (i.e., tribute, slavery, looting), could explain most Egyptian imports at select sites and perhaps the Egyptian imports at Amaziya.

Suggested Models of Economic Interaction

If Tel Erani or another indigenous population center had political and/or economic control of Amaziya and Tell Halif, that would suggest local producers, either as individual or communal agriculturalists, sent

their products to a central entity that stored them (e.g., as in the diagram in [Figure 3.6, 1](#)). That could be at a facility at the population center or, alternately, even at some outlying site such as Amaziya. As suggested by Earle (2002: 216–218), a portion of those products could be used as staples for subsistence. As D’altroy and Earle (1985) proposed, the use of staples rather than the amassing of wealth yields one kind of strategy for promotion on the part of leadership organizations. The remainder would have been redistributed within a population associated with a central entity, which did not produce its own food. Such a process would involve not only grain, legumes, and other dry goods but also liquids such as olive oil and wine.

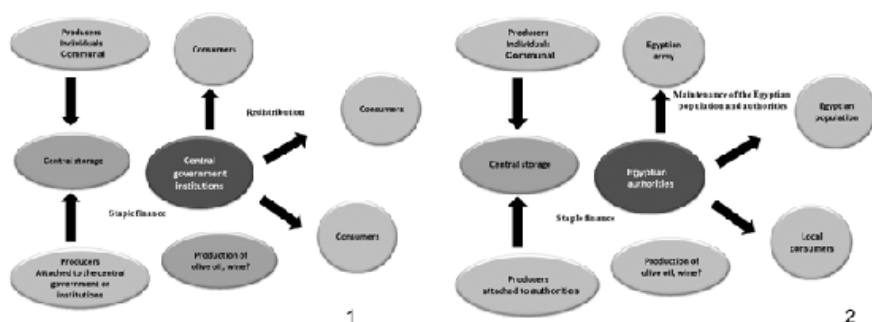


Figure 3.6 Flowcharts of alternate views of the possible functioning of the storage system at Amaziya.

If Egyptian colonial control of the southern Shephela was in effect, in particular in the Nahal Lachish area, the model could have functioned as illustrated in [Figure 3.6, 2](#). In that model the colony, as representative of its Nile Valley sponsors, would also get stored foodstuffs, but the redistribution would be done by Egyptian functionaries (soldiers?) in the source area of agricultural products.

In the first scenario ([Figure 3.6, 1](#)) it is evident that the process of centralization and redistribution of grain and other commodities was connected with local developments, which probably are related to major circulation of goods and the beginnings of urbanization in the south-central region (Milevski 2011). The precise time span remains uncertain, but by late EB I there is indubitable evidence of fortified settlements in the southern Levant, with the peripherally located Arad, in the southeast as one of the lesser examples (Braun 2011a).

If, on the other hand, the large-scale silo complex was related to the Egyptian presence in the southern Levant, it must have been involved in some form of economic activity with local populations in its eastern and southern hinterlands. That would favor the interpretation also of the model of “staple finances” ([Figure 3.6, 2](#)). A mutual association,

indicated by quantities of Egyptian associated materials found at Amaziya, Tel Erani, the Halif Terrace, and other sites in the southern region, would link them to the Egyptian colony dated to the end of EB I or the last eighth of the fourth millennium BC (Braun 2001).

Notes

1.
We wish to thank Linda Manzanilla and Mitchell Rothman for the invitation to publish this chapter and for their critical comments on the text. Thanks are also due Ram Gophna, for his insightful comments on an earlier version of this chapter. We also would like to express our thanks to Alex Fraiberg, Vladic Lipshitz, and Ilan Peretz, as well as Anna Filin, Amir Weitzman, and Svetlana Talis, field supervisors and their assistants, respectively, who participated in the excavation. For their expertise in the study of artifacts and the documentation of the excavation, the authors are also indebted to Omry Barzilai (flint items), Avi Hajian, Mark Cummin, Sharon Gal and Yaakov Shmidov (draft plan and sections), Mendel Kahan and Boris Antin (final plans), Yasser Alamor and Raed Abu Halaf (administration), and workers from Rahat, Qiriat Gat, and Sderot. Pictures and illustrations are courtesy of the Israel Antiquities Authority.
2.
This installation should not be confused with the so-called Silo Site at the Halif Terrace (Alon and Yekutieli 1995), which is a mistranslation of a Hebrew word for silage. It was named for its location adjacent to a modern, bulldozer-cut silage pit, called a “mulch silo” (Levy et al. 1995: 28). Neither should this installation be confused with the cobbled floor of a large circular platform found in Area A (Levy et al. 1997: fig. 4), at one time designated “silo” and associated with a “possible public storage area” (Levy et al. 1995: 30), but which seems to be more likely domestic in function.
3.
Although described as an “Egyptian-style tomb,” a single burial of a female adult in flexed position found on fill at least fifty centimeters above the floor of the cave, is the only evidence of a burial there. It had no accompanying grave goods and thus, cannot be dated. The purported parallels with Dynasty 1 Tombs at Helwan, Egypt, dated to EB II, seem spurious (Braun 2002: 177) and it seems more likely that in Late EB I the cave was not a tomb, but had some other function. It is interesting to note that

the Late EB I houses at the Halif Terrace, generally rectilinear in plan and roughly similar to those at Amaziya, Area B1, were also accompanied by analogous use of natural caves, one of which also had a stone-line corridor leading to its entrance (Levy et al. 1997: fig. 12a). Another, similar underground complex was found at nearby Ziqit (two kilometers south of Amaziya), which was also related to domestic structures dated to the EB I, III, and IV (Y. Baumgarten, personal communication; see also Table 5.2).

4. Renewed excavations at the site slated for the summer of 2015 by Ben Gurion University of the Negev and the Institute of Archaeology of Jagiellonian University, Krakow, will hopefully shed additional light on this late prehistoric period.
5. Whose famous palate is associated with Uruk Mesopotamian sources.
6. This is a small room of irregular plan. Recent excavations of “ovens” with such baking trays at Tel Erani show them to be roughly circular pits of about one meter in diameter and about sixty centimeters deep.
7. Dessel (2009: 34) notes the discovery of an unfired vessel of this type at the Lahav Terrace, in situ, in House 100025, which, except for its relative abundance of Egyptian pottery, is undistinguished from the surrounding houses. Does this represent the presence of an Egyptian in residence, or is it a sign of the household embellished with imported ceramic wares, which adopted an Egyptian custom for baking bread?

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CHAPTER FOUR

GRAIN, STORAGE, AND STATE MAKING IN MESOPOTAMIA (3200–2000 BC)

Tate Paulette

Introduction

In Mesopotamia, grain was king, or, to put it more accurately, grain *made* kings. As we learn in a Sumerian text known as the *Debate between Sheep and Grain*, control over grain could be and often was transformed into control over people.

Whoever has silver, whoever has jewels, whoever has cattle, whoever has sheep shall take a seat at the gate of whoever has grain, and pass his time there. (ETCSL 5.3.2, 190–191)

The states that emerged in Mesopotamia between the fourth and the first millennium BC were fundamentally agrarian states. They were built on the production, stockpiling, and redistribution of grain, and they invested an enormous amount of energy in managing and monitoring the grain supply.

In this chapter, I draw particular attention to grain *storage* and its pivotal role in the rhetoric and the logistics of state making in Mesopotamia. Grain storage facilities were positioned—both physically and symbolically—at the very heart of the redistributive economy and at the very heart of the state apparatus in Mesopotamia. Grain storage, therefore, offers a unique vantage point from which to examine not only the nature of state power but also the process of state making. The earliest Mesopotamian states did not simply appear, fully formed and destined for total domination. They were made. These states were complex, often fragile, constructions, and their reach—that is, the actual extent of their authority—seldom matched the breadth of their ambitions. They were states-in-progress. In this chapter, I argue that a study of grain storage practices can help us to achieve a more accurate estimation of the shifting limits of state power and state-sponsored redistribution in Mesopotamia.

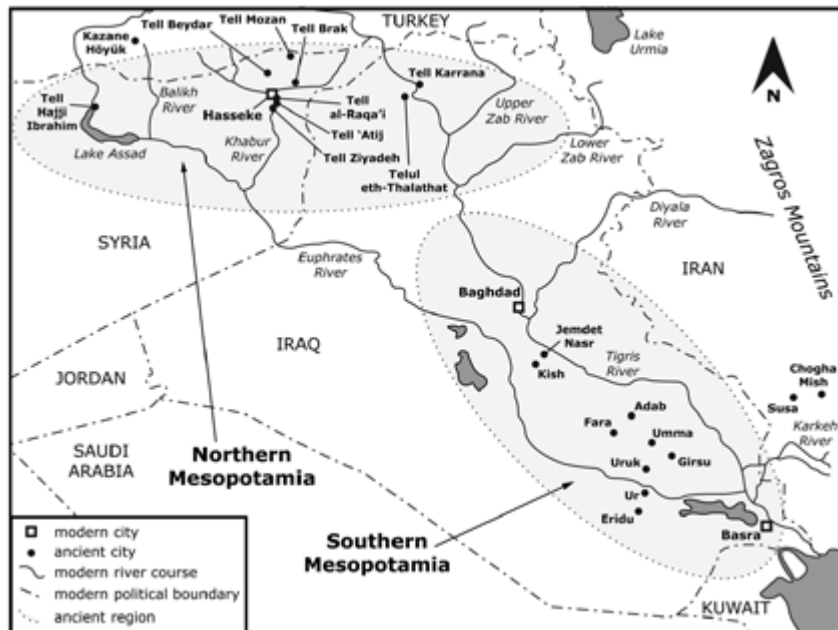


Figure 4.1 Map of Mesopotamia. Base map provided by the Oriental Institute Map Series, Oriental Institute, University of Chicago.

States and Storage in Mesopotamia

The evidence for grain storage in Mesopotamia is abundant, but it lies scattered in bits and pieces across many thousands of cuneiform documents and hidden deep in the pages of archaeological site reports. Significant strides have been made in recent years toward defining the technologies employed and the role of storage in Mesopotamia, thanks especially to a lively debate surrounding the interpretation of a series of sites excavated along the middle reaches of the Khabur River in Syria (e.g., Hole 1991, 1999; Schwartz 1994; Fortin 1997; Pfälzner 2002; Fortin and Schwartz 2003). Still, much work remains to be done. I have chosen to focus here on the evidence for large-scale, institutionally managed storage spaces and storage systems in southern Mesopotamia (Figure 4.1), beginning with the first hints of state-sponsored storage during the later fourth millennium BC (the Uruk period [LC5]) and ending near the end of the third millennium BC (the Ur III period) (Figure 4.2). For a more detailed treatment of the evidence and issues discussed here, with reference to both southern and northern Mesopotamia, see my recent doctoral dissertation (Paulette 2015).

Dates BC (approximate)	Mesopotamia (primary archaeological periods)	Southern Mesopotamia (region-specific periods)	Northern Mesopotamia (region-specific periods)
2000	Middle Bronze Age	Old Babylonian Period	Old Assyrian Period
	Early Bronze Age	Ur III Period	Early Jezireh Period
		Akkadian Period	
3000	Late Chalcolithic Period	Early Dynastic Period	Late Chalcolithic Period
		Jemdet Nasr Period	
		Uruk Period	

Figure 4.2 Chronological chart showing the primary archaeological divisions (Late Chalcolithic, Early Bronze Age, Middle Bronze Age) and the corresponding regionspecific subdivisions of the time period covered in this chapter.

Late Uruk and Jemdet Nasr Periods (ca. 3200–2900 BC)

The fourth millennium BC was a time of rapid and radical change in southern Mesopotamia. The urbanization process—which entailed not only a massive, centripetal sucking-in of population toward urban centers but also a comprehensive reworking of the rural landscape—left in its wake an entirely new settled landscape, one dominated by a few major cities, especially the city of Uruk (modern Warka). This period also witnessed the first moves toward state formation in Mesopotamia; that is, the first moves toward a new kind of institutional form—highly centralized, functionally differentiated, and claiming a monopoly on governance. Given the evidence currently available, we should hesitate before assuming that the appearance of this new institutional form, typically referred to as the state, also implies a unified, society-wide movement toward a new, tightly integrated form of political and economic organization. There can be no doubt, though, that the institutional actors who burst vividly onto the scene with the appearance of writing around 3200 BC were heavily invested in the production and distribution of grain. Many of the earliest proto-cuneiform texts, for example, document the doling

out of grain rations to institutional dependents (e.g., Nissen, Damerow, and Englund 1993: 70–75), a form of redistribution that will continue to play a key role throughout the ensuing millennia.

Among the thousands of “archaic” accounting documents that date to the Late Uruk (Uruk IV) and Jemdet Nasr (Uruk III) periods, the majority revolve around the movement of grain into and out of institutional storage facilities (Englund 1998: 182). For example, a number of texts document the transfer of cereal products—especially barley groats and malted barley—into and out of a storage facility that was dedicated to the storage of ingredients for making beer (Nissen, Damerow, and Englund 1993: 36–46). In some cases, the amounts of grain involved were extremely large; for instance, one of these tablets appears to document the transfer of approximately 135,000 liters of barley over a three-year period (Nissen, Damerow, and Englund 1993: 36–37). A fragmentary text from the site of Jemdet Nasr records an even larger amount, approximately 550 tons of emmer wheat, which seems to represent the yield from several institutionally managed agricultural fields. According to Robert Englund (1998: 204–5), this quantity of wheat is the equivalent of more than a million typical monthly rations (each four-fifths of a liter), enough to support three thousand dependent workers for a year.

Unfortunately, the archaic texts have not provided any direct information about how these institutional storage facilities functioned as physical spaces. We do not know, for example, where they were located, how access was controlled, or what types of storage technology were employed. This is the kind of information that could be furnished by the archaeological record, but no clear remains of dedicated grain storage facilities dating to this period have been recovered. Although the *Riemchengebäude* at Uruk contained large quantities of storage vessels, it is usually interpreted as a storage space for disused temple paraphernalia (e.g., Nissen 1988: 103). The “administrative building” at Jemdet Nasr did include some possible evidence for grain storage (Moorey 1976: 101–2), but not on the scale suggested by the texts. The most vivid evidence for grain storage during this period comes from a series of seal impressions preserved on hollow clay balls and clay sealings recovered at the sites of Susa and Chogha Mish in southwestern Iran. These seal impressions depict what are almost certainly domed granaries; in some cases, workers are shown filling sacks nearby or climbing stairs or ladders to empty the contents of sacks or baskets into the granaries (Figure 4.3; Amiet 1972: pl. 16; Delougaz and Kantor 1996: pls. 35, 38, 44, 131, 133, 149).

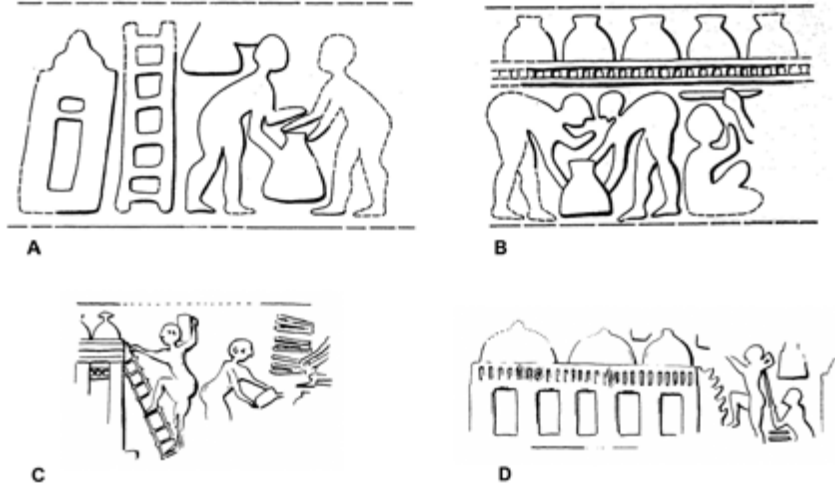


Figure 4.3 Cylinder seal motifs showing granaries, from the sites of Chogha Mish (a, b) and Susa (c, d) in southwestern Iran (after Delougaz and Kantor 1996: pl. 149; Amiet 1972: pl. 16). Courtesy of Editions Paul Geuthner.

Early Dynastic Period (ca. 2900–2350 BC)

The new institutional forms that emerged during the later part of the fourth millennium BC come into much clearer focus during the Early Dynastic period. Over the course of this lengthy period, continuing urbanization across southern Mesopotamia produced a patchwork of city-states, each dedicated to a particular deity and each headed up by a ruler and a substantial team of officials and administrators. Although there are hints of the existence of a multicity confederacy (Martin 1988: 128; Matthews 1991: 13; Visicato 1995: 144–145), each city-state developed a unique local identity and unique forms of institutional organization that would continue to play a role during succeeding periods.

We are particularly well informed about only a few of these city-states, such as Lagash (ancient Girsu, modern Telloh) and Shuruppak (modern Fara). Both of these city-states have left behind a substantial documentary record that provides a wealth of detail about, for example, administrative structures, labor management, and the organization of agricultural production. Most of the sixteen hundred tablets from Girsu, dating to the Early Dynastic III period, derive from a single administrative archive that documents the activities and holdings of a temple dedicated to the goddess Ba’u (or Baba). This temple was not solely a place of worship; the “household of Ba’u” was a major economic player, with at least forty-five square kilometers of agricultural landholdings and a large dependent labor force supported by rations (especially grain) and land allotments (Powell 1990: 8–10).

This archive, therefore, provides a detailed look at one segment within the institutional system of the city-state of Lagash. The texts from Shuruppak, dating to the Early Dynastic IIIa period, cover a much broader cross section of the institutional system and offer a glimpse into the structure of this system (Visicato 1995, 2001). Like other contemporary city-states and like the larger-scale states that would follow in subsequent centuries, the administrative apparatus was conceived as a hierarchy of nested “households” (*é* in Sumerian). Institutional affiliation was likened to membership in a household, and the institutional economy was structured as a collection of self-sufficient but interconnected super-households (not households in a strict sense, defined by kinship bonds or shared residence, but households in a metaphorical sense) (see, e.g., Gelb 1979; Schloen 2001; Garfinkle 2008; Ur 2014).

As in the preceding period, grain provided much of the glue that held these city-state systems together. It is hardly surprising, then, that documents tracking the flow of grain into and out of storage facilities also appear in significant quantities during the Early Dynastic period. The Ba’u temple archive from Girsu references at least thirty storehouses, approximately half devoted solely to grain and the other half functioning as multipurpose warehouses. The two mentioned most often, the *é-kilam* and the *é-kisilla*, were used, for example, to store grain, onions, fish, and agricultural tools (Deimel 1931: 84–85; Schneider 1920: 74). Granaries were staffed by a range of personnel, including the *ka-guru* or “granary supervisor,” who appears often in the texts as the official responsible for receiving and dispensing grain (Deimel 1931: 84–85). As architectural spaces, these institutional storage facilities must have been substantial; one Girsu text, for example, documents the delivery of more than 345 tons of barley, the yield from nine agricultural fields, into a storehouse (Bauer 1998: 536).

Thirty-two enormous, cylindrical, subterranean silos were identified during the excavations at Fara (Shuruppak). These silos were scattered across the site, but there was a particular concentration in the northern portion of the mound (Figure 4.4; see below for further discussion; Martin 1988: 47, 110–112, figs. 12, 14, 20, 33, pls. XII–XIV). At Girsu, the so-called Urnanše Building or “Maison des fruits” has also been interpreted as a storehouse; this rectangular construction (10.5 by 7.3 meters) included two large, bitumen-lined rooms that were surrounded by a corridor and that appear to have been accessed from above (Schneider 1920: 74; Huh 2008: 85–91). The Early Dynastic period has also produced some of the first evidence for palaces. These massive constructions, excavated, for example, at

Eridu (Safar et al. 1981), Kish (Moorey 1976), and Uruk (the *Stampflehmgebäude*; Eichmann 2007), typically included areas devoted to storage or, at least, rooms whose shape and location suggest a storage function. Likewise, a row of long, thin rooms within the temple of Nanna at Ur probably functioned as a storage magazine (Dolce 1989: 27).

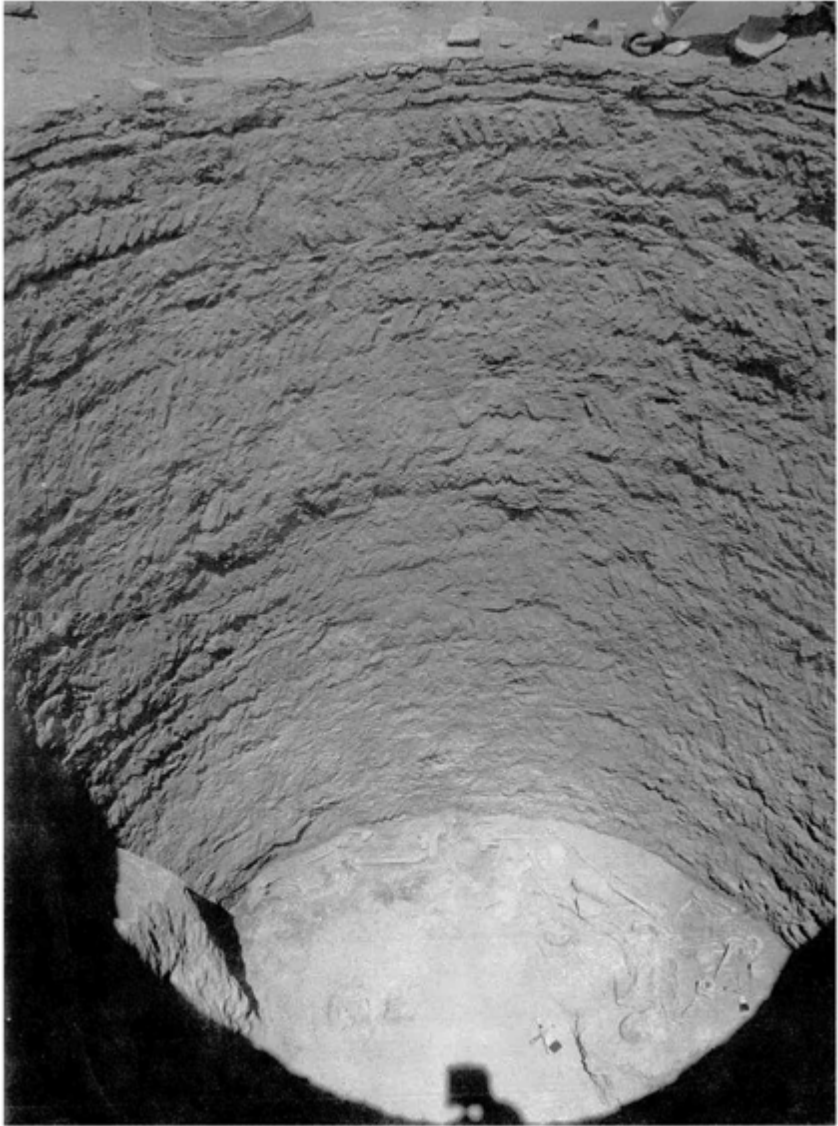


Figure 4.4 Silo (Pit I) excavated at the site of Fara (ancient Shuruppak) in southern Iraq (Martin 1988: pl. XIII). Courtesy of Harriet Martin.

Some proportion of the grain that was produced on institutional land during the Early Dynastic period would have made its way, physically, into the palaces and temples, but we should also be

envisioning a much more extensive network of storage depots within the city and in the countryside, perhaps analogous to the roughly contemporary structures excavated in northern Mesopotamia at sites such as Tell Beydar (Sténuît 2003), Telul eth-Thalathat (Fukai, Horiuchi, and Matsutani 1974), Tell Karrana (Wilhelm and Zaccagnini 1993), Tell al-Raqa'i (Schwartz 1994; Fortin and Schwartz 2003), Tell 'Atij (Fortin 1997; Fortin and Schwartz 2003), Tell Ziyadeh (Hole 1991, 1999), Tell Hajji Ibrahim (Danti 1997), and Kazane Höyük (Creekmore 2008).

Akkadian Period (ca. 2350–2200 BC)

The end of the Early Dynastic period was marked by an escalation in intercity strife and by a number of attempts at conquest on a regional scale. The first successful effort to establish a unified, pan-Mesopotamian state was carried out by Sargon of Akkad around 2340 BC. The Akkadian dynasty founded by Sargon exercised hegemony—although by no means unquestioned hegemony—over southern Mesopotamia until approximately 2200 BC. The Akkadian kings also made significant efforts to expand outward into surrounding regions, but the nature of the Akkadian presence in these areas remains a subject of significant dispute.

The administration of this new, unified polity raised a host of logistical challenges that were met with a mixture of centralization, standardization, and a retooling of the redistributive systems and power structures already in place. The Akkadian kings, for example, introduced a new calendar and a standardized system of weights and measures. They also installed “sons of Akkad” as governors (*ensi*) in the previously independent city-states. The financing of the expanded state apparatus required a substantial broadening of the available resource base, and the Akkadian kings appear to have accomplished this by embarking on a major program of land acquisition—building up significant new holdings of agricultural land through a combination of conquest, confiscation, and purchase. Some of this land was held directly by the central government, and some was considered the responsibility of the governor. Both of these parties could then distribute parcels to loyal retainers, either as a form of remuneration or as a lease (Foster 1993: 29–31; Foster 1982a: 109–12).

As harvested grain made its way from the agricultural fields toward state storehouses, it passed through several administrative checkpoints. The first was the threshing floor, a primary collection point where yields could be assessed, debts settled, and a first division

of the harvest carried out. At Umma, for example, lessees were responsible for transporting the harvested grain to the threshing floor, where an official known as the *sagapin* recorded the volume of grain delivered, the name of the lessee, and often the field from which the grain had come. The proportion owed to the state was then removed and transferred to a storage facility (Foster 1982b: 101–102, 147). The grain was accounted for a second time at a building known as the *é-gidri* or “Scepter House,” an important administrative office located within the city of Umma, although the grain itself may not have actually entered this building in a physical sense (Foster 1982b: 101–102, 147). As in the Early Dynastic texts from Girsu, deliveries of grain into and out of storage facilities were the responsibility of the *ka-guru*⁷ or “granary supervisor” (Foster 1982b: 90, 95).

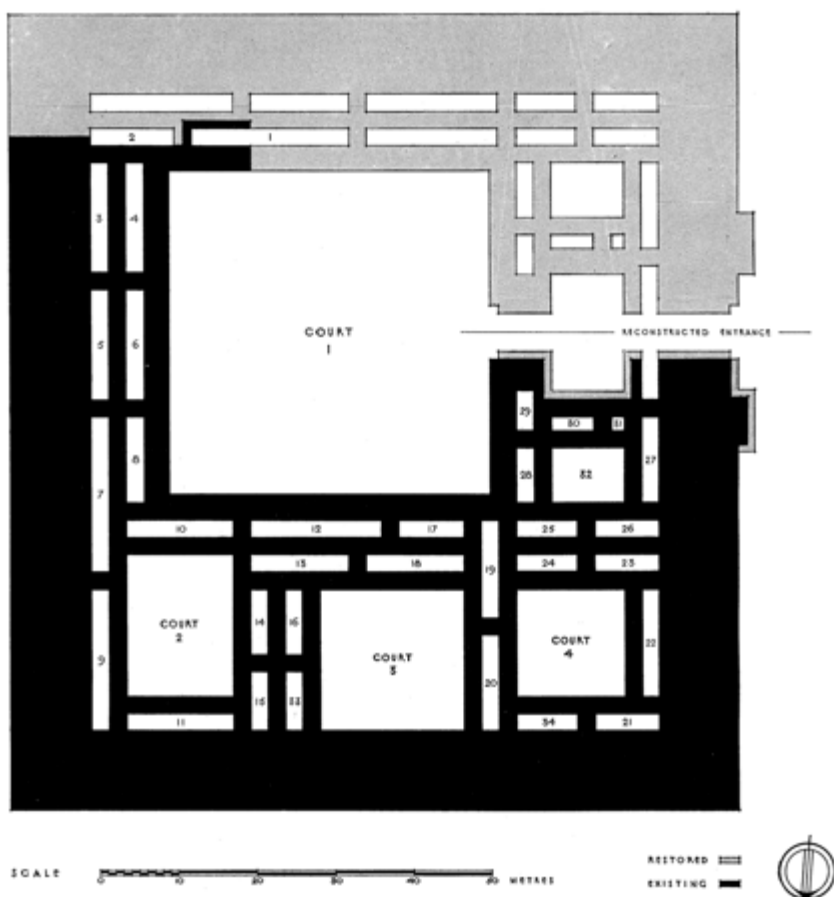


Figure 4.5 The “palace” built by the Akkadian king Naram-Sin at Tell Brak in Syria (Mallowan 1947: pl. LX). Courtesy of the British Institute for the Study of Iraq.

The grain collected in these institutional storehouses could then be redirected—either unprocessed or after being transformed into flour,

bread, beer, and so on—toward a variety of uses (Foster 1982b: 102–16). In the city of Adab, for example, barley from the city storehouse was distributed for rations, for seed, for export via boat, and perhaps for transport to the capital city of Agade as tribute. It was also sent to the governor’s kitchen and brewery (Yang 1989: 256–260).

The best archaeological evidence for storage during the Akkadian period comes from a series of sites in northern Mesopotamia, well beyond the core of the Akkadian state. At Tell Brak, for example, the so-called palace built by the Akkadian king Naram-Sin was almost certainly a fortified storehouse, rather than a palace as such (Figure 4.5). This massive construction, approximately one hundred meters on a side, included at least forty long, narrow, magazine-like rooms arranged around a series of large courtyards (Mallowan 1947: 27–28, pls. LIX–LX; Oates, Oates, and McDonald 2001: 19–21, 383–386; Paulette 2015: 78–82). It seems clear, based on a wide range of archaeological and written evidence from the site, that Tell Brak was functioning as a key node of Akkadian control in the region. Tell Mozan, another major urban center in northern Mesopotamia, has also produced evidence for large-scale storage and a clear connection to the Akkadian state. In this case, the “royal storehouse” was located within a palace occupied by a local ruling family; according to the excavators, the connection to the Akkadian state was probably one of alliance, cemented by the marriage of Naram-Sin’s daughter to the local king, rather than outright domination (Buccellati and Kelly-Buccellati 1995–96, 2002: 13–15).

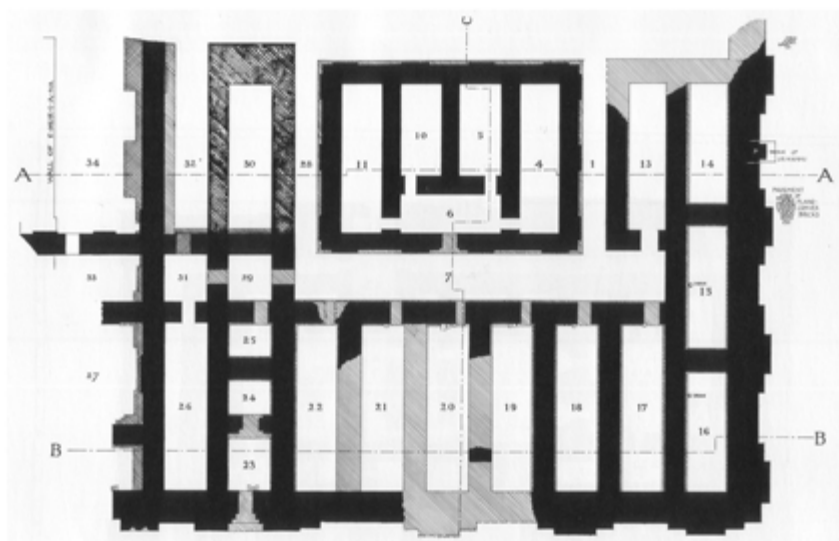
Ur III Period (ca. 2112–2000 BC)

The collapse of the unified Akkadian state around 2200 BC ushered in another phase of local autonomy, competing power blocs, and political maneuvering, summed up famously in the Sumerian King List with the phrase, “Who was king? Who was not king?” A number of prominent city rulers, such as Gudea of Lagash, struggled to establish primacy, but it was only with the rise of the Third Dynasty of Ur (also known as Ur III) around 2112 BC that the level of comprehensive, region-wide power exercised by the Akkadian kings was reestablished. Although the Ur III dynasty was founded by Ur-nammu, his successor Shulgi appears to have been responsible for the sweeping set of reforms that transformed the Ur III state into the exemplar (or cautionary tale) of highly centralized, top-down management that we know today.

One of the most interesting economic innovations introduced by the Ur III dynasty was the so-called *bala*, a vast redistributive system that

facilitated the movement of goods among the different provinces. Each province was required to contribute a certain quantity of goods, based on the productive capacity and the particular specialization of that province, to a central fund, from which it could then withdraw needed goods. The *bala* contributions were assembled and redistributed at purpose-built collection centers; the best known of these was Puzrish-Dagan, which specialized in animals and animal products, but a center specializing in agricultural products may have been located at the town of Dusabara (Steinkeller 1991: 22–23). The Ur III state also operated large-scale workshops or factories, often staffed largely by women and dedicated, for example, to textile manufacture (Waetzoldt 1972; Wright 1996) or the grinding of grain (Grégoire 1999). The workers in these factories were supported by rations, as were many other state dependents and employees (e.g., Gelb 1965).

The massive holdings of agricultural land administered by the Ur III state were, in many cases, cultivated directly by dependents workers, overseen by an *engar* or “farmer,” but parcels of land were also leased out to tenants and distributed to state dependents as a form of remuneration (Ellis 1976: 81–82). In many ways, the Ur III administrative apparatus appears to have been designed to squeeze out every last bit of productive capacity from the realm and to funnel surpluses into state coffers, a classic example of tightly controlled, heavily centralized, economic maximization (e.g., Adams 1978). Much of the grain produced on institutional land, therefore, made its way into urban storehouses; a possible example, the so-called *é-nun-mah*, was excavated by Sir Leonard Woolley at Ur in the 1920s and 1930s (Figure 4.6; Woolley 1974: 45–54; Paulette 2015: 157–161).



As part of his detailed study of the landscape in the Umma province, Piotr Steinkeller has been shedding light on another important dimension of the state infrastructure: the network of rural storage facilities where grain was collected immediately following the harvest. Steinkeller has identified references to at least eighty-five hamlets or small villages, many of which appear to have been “highly specialized agricultural outposts,” consisting of little more than a threshing floor (*ki-sur*¹²), a grain silo (*guru*⁷ or *i-dub*), and perhaps a few houses. These “minimal settlements” were spread out across the countryside as nodes of institutional administration, where grain was collected and partially processed before being shipped onward to Umma and other towns. Some of these rural settlements, also outfitted with threshing floors and storage facilities, appear to have functioned primarily as roadhouses for travelers. Some were more substantial settlements that included large-scale storehouses (*gá-nun*), palaces (*é-gal*), temples, and a variety of other facilities (Steinkeller 2007: 190–193).

In the Ur III texts, the *ka-guru*⁷ or “granary supervisor” often appears as a high-level government official. A *ka-guru*⁷ named Arad, for example, was “the chief official in charge of grain processing, storage, and distribution at Umma” and may have been the brother of the governor of the province (Steinkeller 2004: 68). Arad appears in numerous documents as the official responsible for distributing grain and grain products from a series of storehouses in the city of Umma and in the surrounding countryside. This does not mean, however, that he was physically present at those storehouses; to the contrary, the grain transfers in question were almost certainly conducted by others, although with his stamp of approval (Steinkeller 2004: 68–72).

A number of recently published texts from the town of Garshana (near Umma) also provide interesting details about Ur III grain storage practices. Guards, for example, were stationed daily at a storage facility (*ganun*), their task described as “sitting in the *ganun* storage” (Heimpel 2009: 328). Some texts from Girsu similarly describe guard duty at a storage facility as “sitting by” the *ganun* (Mander 1994: 99, cited in Heimpel 2009: 328). Many of the texts from Garshana also document the activities of porters engaged in transporting grain from a variety of locales to a storehouse (*ganun*) and granary (*gur*⁷) at Garshana, often by loading the grain into sacks and shipping it by boat (Heimpel 2009: 308–316).

State Making and State Space

The basic narrative of state formation and succession in Mesopotamia, as rehearsed in the preceding section, is well known and, at least on the surface, relatively straightforward. It is important to point out, though, that opinions differ, sometimes markedly, as to exactly what these states were, how they were constructed, and how pervasive their systems of economic management and control were.

Some historians and archaeologists envision the states of early Mesopotamia as more or less unified systems: comprehensive, highly integrated, neatly organized structures of dependency and control (e.g., Deimel 1931; Falkenstein 1974; Steinkeller 1999). This vision of wholesale subordination to the will of god and/or king is certainly an image that the palace and temple institutions themselves strove to project, but how seriously should we take their propaganda? Undoubtedly, the individuals who were responsible for forging the institutional narrative—we seldom know exactly who was responsible—were tapping into and expanding on an existing conceptual repertoire, a shared cultural logic or worldview that already incorporated a specific understanding of authority, interdependency, duty, and so on (see, e.g., Schloen 2001). The propaganda made sense. But this does not mean that it was an accurate description of existing power relations. As Seth Richardson has recently argued, these states presumed or claimed a degree of sovereignty that they were not necessarily able to put into practice. They were projects, not accomplished facts, and they were typically unfinished (Richardson 2012: 4). The visions of order and authority that gave these projects their force did underwrite significant expansions in institutional control, but we should be careful not to assume that the rhetoric of state making—the “state idea” (Abrams 1988: 75)—actually matched the reality.

Indeed, it has become increasingly clear that the sociopolitical landscape in third millennium Mesopotamia was more heterogeneous and more heterarchical than once assumed (Adams 1984: 89–97; 2004: 46–48; Yoffee 1995: 299–302; Stein 2001: 214–221). The palaces and temples—that is, the primary “state” institutions—had certainly established an imposing presence within the urban and rural landscape, and large numbers of people were linked into the institutional system as dependents of one kind or another. The palace and temple institutions did not, however, always act in concert with one another, and they did not exercise an absolute monopoly on governance and patronage. They acted alongside and sometimes in competition with a series of community organizations, corporate groups, and local governing bodies (Yoffee 2005: 109–112). At the same time, institutional affiliations were crosscut by linguistic, ethnic,

kin-based, and occupational allegiances, and evidence for a significant noninstitutional or extra-institutional economy continues to mount (e.g., Diakonoff 1982; Gelb 1971, 1979; van Driel 2000, 2005; Robertson 2005).

The emerging picture is one of distributed authority, discontinuous power, incomplete control, economic diversity—a far cry from the all-powerful, all-inclusive “temple-states” (Deimel 1931) once imagined. It would certainly be unwise to overestimate the degree of autonomy and choice that people were able to exercise, denying the very real effects of institutional expansion and intervention, but it does seem increasingly likely that some portion—possibly a large portion—of the population managed to remain beyond the grasp of institutional control. This complicates our understanding of state formation in Mesopotamia.

In a series of books, especially *Seeing Like a State* (1998) and *The Art of Not Being Governed* (2009), James C. Scott has developed a rich and insightful commentary on what he calls “state spaces,” that is, geographical zones that are particularly amenable to centralized governance, surveillance, and appropriation (Scott 1998: 183–91; 2009: 13, 40–63). Scott focuses much of his attention on southeast Asia, but his discussion of the state-making potential of irrigated river valleys could easily be transplanted to southern Mesopotamia. As we saw above, the alluvial lowlands of southern Mesopotamia have played host to a whole series of state-making projects, some more successful than others but all built on a backbone of large-scale, intensive, irrigated agriculture. In the framework laid out by Scott, this region would appear to be the very definition of *state space*: a zone of concentrated resources and densely packed population, ripe for the picking by would-be state makers. At a certain level of abstraction, this characterization is probably apt, but I would like to argue that early Mesopotamian cities and the surrounding countryside were not actually (or not entirely) state spaces. Yes, the palace and temple institutions were able at various points to establish a firm presence within both the urban and the rural landscape, but their ability to manage, mold, and control these spaces was only partial.

The institutions were particularly interested in grain and grain products, as witnessed by the mountain of “paperwork” generated in the effort to track the movement of grain across the landscape, especially as it moved into and out of various storage facilities. We still, however, need a better understanding of exactly how grain storage fit into specific state-making projects and how it impacted the lives of the people involved. One first step is developing a more accurate assessment of the magnitude of the centralized storage

economy, of who was and who was not contributing to and withdrawing grain from institutional granaries. This is a not a simple task, but it does offer a potential path toward gaining a better grasp on the scope of redistribution and institutional dependency in Mesopotamia. Here, I would like to introduce a brief case study to demonstrate the kinds of quantification that are possible.

Quantifying Dependency

In Mesopotamia, state making typically required the creation of a dependent labor force, that is, people who relied on the state institutions to provide them with the basic necessities of life. Dependency took many forms. Some people (or households) found themselves attached to a wealthier patron household; some to the palace; some to one of the temples that dotted the urban landscape. Some were remunerated with wages or rations; some with land grants (e.g., Van De Mieroop 1997: 142–158, 176–189). Dependency was typically understood via the metaphor of “household” membership. That is, dependent individuals and households were considered to be part of the household of the patron—regardless of their actual place of residence—and this basic household structure was replicated at higher and higher levels of the social ladder, resulting in complicated, multi-tier structures of interlocking, nested households (Gelb 1979; Schloen 2001; Ur 2014).

This complexity makes quantification difficult. Any attempt to measure or model dependency in Mesopotamia is bound to be an oversimplification, but it is still worth making the effort. I suggest, in particular, that we can learn something important about the logic, the logistics, and the limits of state making if we focus on quantifying the storage economy. Many people relied on regular allotments of grain and other goods from institutional storage facilities. The question is how many people.

Excavations at the site of Fara (ancient Shuruppak) have provided a particularly interesting mix of archaeological and written evidence for grain storage and redistribution (Paulette 2015: 127–137). I cannot claim that this site is typical, but it does provide a fascinating glimpse into the physical infrastructure and the magnitude of the institutional storage economy during the Early Dynastic IIIa period (mid-third millennium BC).

Fara is located in southern Iraq, midway between Baghdad and the head of the Gulf. The site covers a total area of approximately 220 hectares and rises to a maximum height of 10 meters above plain level (Martin 1988: 12–14). During a single excavation season in 1902–3, a

team from the Deutsche Orient-Gesellschaft (DOG) identified and mapped thirty massive subterranean silos at Fara. They excavated the contents of nine of these structures (Andrae 1903: 8–9; Heinrich 1931: 8–9; Martin 1988: 110–12). In 1931 a team from the University of Pennsylvania then excavated two more silos (Pit I and Pit II), neither of which had appeared on the earlier DOG map (Figure 4.7; Martin 1988: 42–47).

The silos were typically round or elliptical in plan and measured an average of four meters in diameter and ten meters in depth (Martin 1988: 47). They were lined with carefully laid baked bricks and a layer of mud plaster. Although some evidence for roofing was identified, the uppermost portions of the silos did not survive intact, and it is unclear exactly how they would have been covered and accessed (Heinrich 1931: 8–9, tables 3–4; Martin 1988: 42–47, 110–112, fig. 20a–b). The fill layers excavated within the silos all appear to have been deposited after the primary use-life of the structures (Martin 1988: 42–46, 110–112); no clearly in situ remains of the goods that they once held have been found (cf. Martin 1988: 47). The original function of these structures, therefore, is not completely certain (see, e.g., Andrae 1903: 8–9), but it is likely that they were indeed silos, used primarily for the storage of grain (Martin 1988: 47). The absence of detailed measurements for most of the silos hinders our ability to derive estimates for their individual and combined storage capacity. Harriet Martin, however, estimates that each silo would have held a maximum of 125 cubic meters of grain (Martin 1988: 47), and Giuseppe Visicato estimates an average capacity of 100 cubic meters (Visicato 1993: 83; Pomponio and Visicato 1994: 205n70).

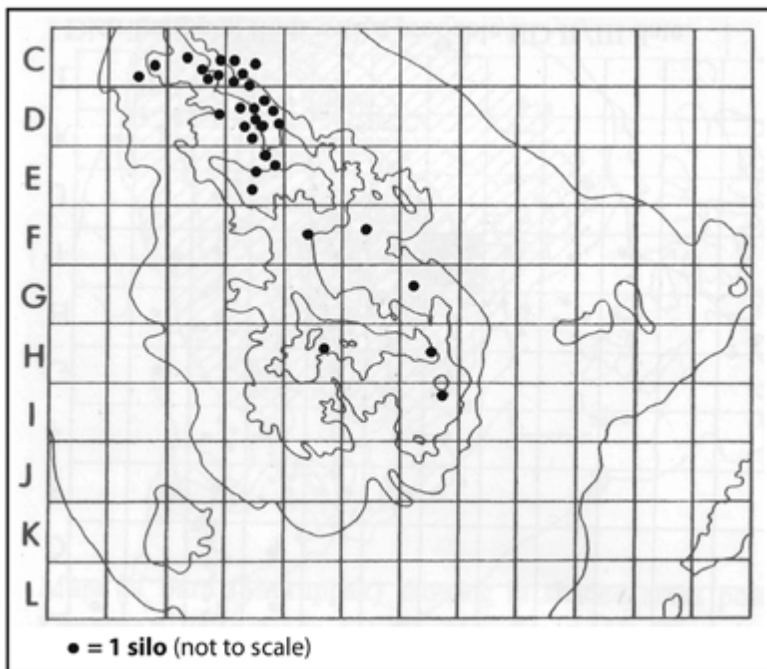


Figure 4.7 Map showing the distribution of silos at Fara (ancient Shuruppak) in southern Iraq (after Martin 1988: fig. 33). Courtesy of Harriet Martin.

More than a thousand cuneiform tablets and tablet fragments have been recovered at Fara (Martin 2001: 3). Many of these tablets record the transfer of grain into and out of institutional storage facilities, but the storage facilities themselves are only rarely specified by name. Five storehouses (*ganun*) have been identified in the documentation: *ganun-mah*, *ganun gúr-gúr*, *ganun (d)šeš.ki-na*, *ganun me-pa-è*, and *ganun en* (Visicato 1993: 93; Pomponio and Visicato 1994: 205). It is difficult to say anything definitive about the form or capacity of these storehouses (cf. Martin 1988: 47; Pomponio and Visicato 1994: 205n70), but in a few cases the tablets do reference the quantities of grain either withdrawn from or deposited into them. For example, one brief text (WF 55) records the delivery of barley, to be used as seed grain, from two storehouses: 4,482 liters (eleven *gur-mah*, two *bariga*)¹ from the *ganun-mah* and 3,884 liters (nine and a half *gur-mah*, two *bariga*) from the *ganun gúr-gúr* (Pomponio and Visicato 1994: 205). A large number of tablets provide similar details about the size and destination of grain deliveries but, unfortunately, without a reference to the storehouse(s) from which the grain was disbursed. For example, two texts (WF 84 and WF 85) document the allocation of very large quantities of barley—a total of 252,586 liters (634 *gur-mah*) and 441,278 liters (1,107 $\frac{1}{2}$ *gur-mah*, 1 *bariga*)—to a series of officials, who may have then distributed the barley as rations (Pomponio and

I have explored the broader implications of the quantitative data from Fara in some detail elsewhere (Paulette 2015: 131–37, 169–171, 182–185, tables 5.2–5.6). Here I focus on one particular issue: the number of people that could have been supported if the grain stored in the silos was destined for distribution as rations. Visicato (1993: 83–85) has made an interesting argument that ties together the archaeologically recovered silos, a series of grain transfer documents, and Martin's estimate for the population of the settlement. He first calculates the total storage capacity of the thirty-two silos as approximately eight thousand *gur* of barley, the equivalent of 3.5 million daily rations or enough barley to feed twenty thousand people for a period of six months (after which time the silos could be refilled with barley from the next harvest). He then calculates the total quantity of barley transacted within the administrative archives from the site (over a six-month period) as approximately seven thousand *gur*, a figure that corresponds well with the eight thousand *gur* of silo capacity. He also points out that a population of twenty thousand fits well with the total population estimate of fifteen thousand to thirty thousand suggested by Martin (1988: 127). If I understand Visicato's argument correctly, the upshot is twofold: (1) the grain stored in the silos would potentially have been enough to feed the entire population of the city for a period of six months and, (2) this supply of grain was fully under the control of the city's administrative apparatus. The implication is that the entire population of the city was supported by a centrally managed system of staple redistribution.

If correct, this would be a significant finding, but I think that we should be skeptical for at least two reasons. First, it is extremely unlikely that the available silo capacity in the city was so closely matched with the agricultural productivity of the fields that the entire complement of silos would have regularly been filled up to the brim following the harvest and then completely emptied in preparation for the next harvest. The more likely scenario is that the maximum storage capacity was seldom reached, perhaps only in exceptionally productive years (see, e.g., Forbes and Foxhall 1995: 74–75). Second, it is extremely unlikely that the full volume of grain stored in the silos would have been earmarked for immediate distribution as daily rations. Indeed, one of the texts mentioned above (WF 55) documents the withdrawal of seed-grain (i.e., grain that was not being used for rations) from two storehouses. At the same time, I think that we must assume that some quantity of grain was being stored as a buffer against future crisis—probably at least enough to cover an additional six months, if not an additional year or more.

Table 4.1

Chart Showing the Estimated Storage Capacity (in ancient gur or liters) of the Thirty-Two Silos Identified at Fara. See Paulette 2015: Table 5.6

Source	Storage capacity (32 silos)	Daily rations	Number of people fed with rations (% of population fed)		
			6 months	1 year	2 years
Visicato	8,000 gur	3,500,000	20,000 (67%–200%)	10,000 (33%–100%)	5,000 (17–50)
Paulette	3,200,000– 4,000,000 l	1,200,000– 4,000,000	6,557–21,858 (22%–219%)	3,288–10,959 (11%–110%)	1,644–5,479 (5%–55%)

Table 4.1 shows Visicato’s calculations, as well as my own attempt to produce comparable figures. In both cases, I have included estimates for the number of people that could have been fed with rations for a period of six months, one year, or two years, and I have converted these values into percentages of the total population of the settlement.² These calculations indicate that the grain stored in the silos might have been enough to support the entire population of the settlement for a period of six months or one year; in both cases, it also might *not* have been enough. If the grain was intended to provide support for two years, the calculations suggest that only half of the population could have been fed and perhaps much less than half. To my mind, the two-year estimate is likely to be closest to the truth. Visicato may be correct in assuming that the silos would have been completely emptied over the course of the six-month period between harvests, but it is much more likely that the goal would have been to keep enough grain on hand for the current year and, as a buffer against crisis, for the following year.

The exercise in quantification does not unambiguously demonstrate the existence of an all-encompassing redistributive system at Fara, but neither does it provide clear evidence against such a system. What it does offer is one more piece in a complicated puzzle. The archaeological and written evidence from Fara seems to indicate a complex mixture of centralizing and decentralizing forces. Visicato, for instance, has emphasized the hierarchical, pyramid-like structure of the administrative system and, by extension, the organization of the city as a whole (Visicato 2001; 1995: 138, 147–148). Matthews (1991: 12–13), on the other hand, envisions a less integrated structure, with “discrete or semi-discrete households” as “the fundamental unit of

society and administration at ED III Fara” There is also clear evidence that the city was part of a multicity coalition. It is even possible that the grain stored in many of the silos was destined for the provisioning of coalition troops, rather than city residents (Martin 1988: 128; Visicato 1995: 144–145).

Discussion

To close, I would like to emphasize a few key points. First, the political history of Mesopotamia during the fourth and third millennia BC is not a history of the state; it is a history of states (plural) and state making. Although I recognize that the term *state* can be problematic for a number of reasons (e.g., Smith 2003: 78–111), I have used the term to highlight the fact that the idea of the state—the state as a fully integrated totality from which there is no possibility of escape—is not just an artifact of recent history. This idea was already being developed and deployed in early Mesopotamia, and it must be taken into account, even if the ultimate goal is to tear down the façade and produce a more complicated account of institutional construction and political practice. One of the ways to begin tearing down this façade is to focus on the practicalities of state making, that is, on the symbolic production of the state idea and the material production of an institutional apparatus. I have focused on this institutional apparatus and, in particular, on the role of grain and grain storage.

In all of the diverse attempts at state making outlined above, grain occupied a key strategic position, most crucially as a means of gaining access to and control over labor. These state-making projects were not (or were not solely) abstract experiments in social and political philosophy, efforts to redefine and reshuffle existing notions of authority, rule, duty, dependency, and so forth. They were power grabs that required control over the production and distribution of basic foodstuffs. State making was conducted, to a large extent, in the realm of gastro-politics (Appadurai 1981: 495), and in Mesopotamia gastro-politics was all about grain—the cultivation, stockpiling, and distribution of grain.

In this chapter, I have suggested that a quantitative examination of grain storage practices offers one means of beginning to disentangle the rhetoric of state making from the material practicalities of institutional construction and maintenance. As demonstrated in the brief case study, this approach may not always result in definitive conclusions, but it does help us to think in more concrete terms about the scope and the limits of institutional power in Mesopotamia.

1.

It is important to point out that there is disagreement about how the Early Dyanstic units of measurement should be converted to liters. In this paragraph, I have followed Visicato (1993: 83) and Ellison (1981: 38) in assuming that one *sila* equals 0.83 liters, but see Pomponio and Visicato (1994: 32n4) for a discussion of the wide range of possibilities. I have also relied on the following equivalencies: 1 *gur-mah* = 480 *sila* and 1 *bariga* = 60 *sila*. The four conversions were conducted as follows: (1) 11 *gur-mah* 2 *bariga* = 5,400 *sila* = 4,482 liters; (2) 9 ½ *gur-mah* 2 *bariga* = 4,680 *sila* = 3,884.4 liters; (3) 634 *gur-mah* = 304,320 *sila* = 252,585.6 liters; (4) 1,107 ½ *gur-mah* 1 *bariga* = 531,660 *sila* = 441,277.8 liters.

2.

Visicato himself only calculated the number of people that could be fed for a six-month period (i.e., not one year or two years), and he did not explicitly discuss the percentage of the population that could have been fed. Where I have expanded on his calculations, the values in the table are shown in *italics*, rather than normal type.

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NEW WORLD BUREAUCRACY AT 1500 BC: EVIDENCE FROM THE CASMA VALLEY OF PERU

Thomas Pozorski and Shelia Pozorski

Introduction

We are especially pleased to be part of this volume because it gives us the chance to exchange ideas with scholars working worldwide on issues concerning bureaucracy, storerooms, and administrative devices. The evidence for our ideas includes regularly laid-out storage structures, stamp and cylinder seals, and other emblems of bureaucratic power. This chapter represents an attempt to put these features in context by first describing the complex polity that occupied the Casma Valley of Peru during the Initial Period (1800–1400 BC). Subsequent sections provide details about storage structures and especially their modular architectural form, which became emblematic of bureaucratic power and control within the polity. These data are followed by descriptions of associated artifacts that may relate to bureaucratic activities.

Sechín Alto Polity Complexity

The Sechín Alto Polity occupied the Casma Valley area for about four hundred years and encompassed both branches of the Casma River and the adjacent coastal zone ([Figure 5.1](#); S. Pozorski and T. Pozorski 1986, 1987, 1992, 2002, 2008; T. Pozorski and S. Pozorski 2005). Major component sites include the following: (1) the four sites of Sechín Alto, Taukachi-Konkán, Sechín Bajo, and Cerro Sechín within the northern Sechín Branch that are grouped into the Sechín Alto Complex based on coincident layout and orientation ([Figure 5.2](#); S. Pozorski and T. Pozorski 1987: 82; 1992: 860); (2) the site of Pampa de las Llamas-Moxeke that dominates the southern, Casma branch of the river; and (3) the three coastal sites of Bahía Seca, Tortugas, and Huaynuná ([Figure 5.2](#)). The Sechín Alto Polity exhibits a high degree of social complexity through a variety of tangible measures, including hierarchical relationships among sites; internal site planning; magnitude of corporate labor or public construction; access control; standardization of architecture; and physical remains of plants,

animals, and subsistence-related artifacts.

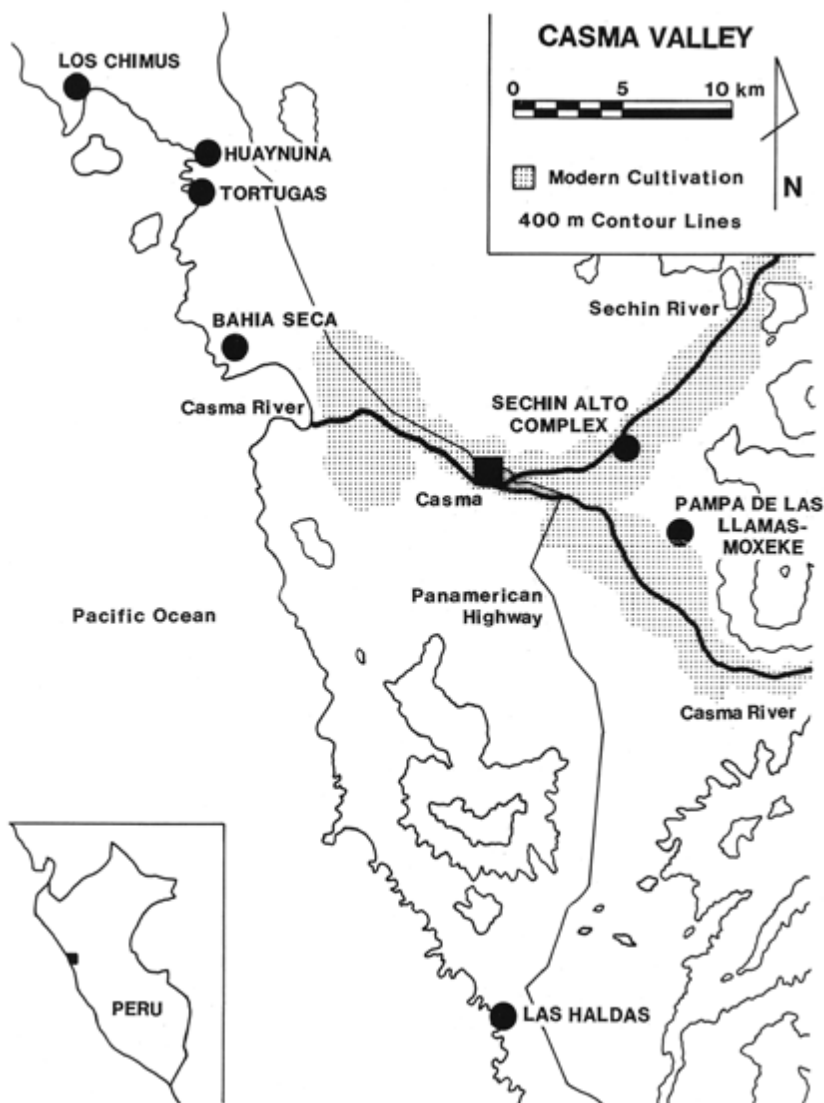


Figure 5.1 Map of the Casma Valley showing the location of early sites.

A multilevel site hierarchy has been cited as an indicator of both social complexity and centralized political organization (Flannery 1998: 16–21; Haas 1982: 103–106; Johnson 1973; Wilson 1988: 87; Wright and Johnson 1975). A site hierarchy of five or more levels is headed by Sechín Alto site with its immense principal mound and numerous subsidiary structures (S. Pozorski and T. Pozorski 2002; T. Pozorski and S. Pozorski 2005). Secondary to this site are Pampa de las Llamas-Moxeke and Taukachi-Konkán, which closely resemble each other in layout. Next are Sechín Bajo and Cerro Sechín, the

smallest of the inland sites. Fourth in the hierarchy is Bahía Seca, a coastal administrative center, that likely coordinated resource procurement by the smaller, fifth-level sites of Tortugas and Huaynuná. Hard-to-find field camps and other small sites now obscured by cultivation would have composed a sixth level within this hierarchy.

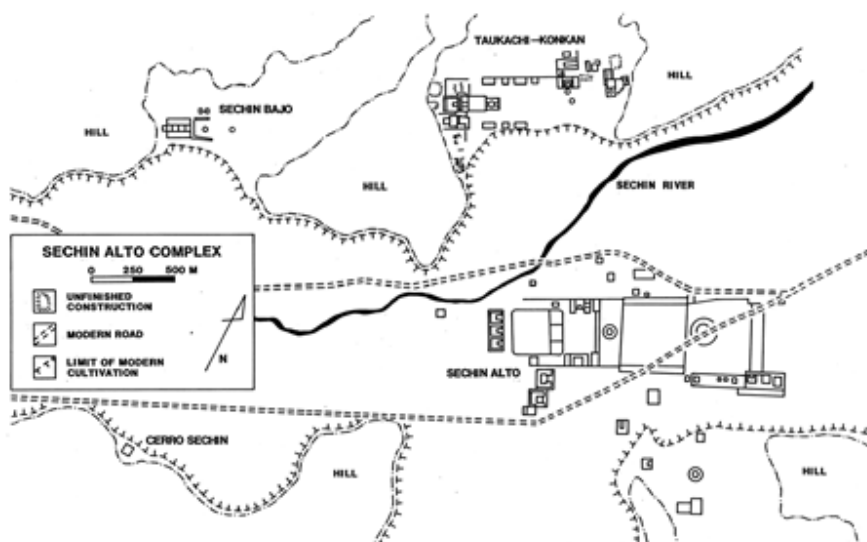


Figure 5.2 Plan of Sechín Alto Complex showing the location of the four component sites of Sechín Alto, Taukachi-Konkán, Sechín Bajo, and Cerro Sechín.

Precise intrasite planning is evident at all Sechín Alto Polity inland sites. Main mounds and associated plazas exhibit precise bilateral symmetry, and intermediate-sized structures usually face inward and are arranged in rows that follow orientations established by the main-mound central axis. Evidence of planning is especially clear at Pampa de las Llamas-Moxeke, the best-preserved site within the polity (Figure 5.3; S. Pozorski and T. Pozorski 1986, 1987). The central axis of N41°E at the site is established by the mounds of Moxeke and Huaca A that face each other across a series of large plazas. Intermediate-size mounds, other public architecture, and highstatus residential architecture adhere to this orientation, except in the case of mounds oriented toward roads providing access to the site (S. Pozorski and T. Pozorski 1991). Efforts to adhere to the established orientation were so precise that even now, after thousands of years of exposure to the elements, the longest row of mounds diverges only thirty centimeters off a straight line across a distance of more than seven hundred meters. Furthermore, the “master plan” was followed across generations as mounds were constructed in spaces to fill in rows, at times at the expense of residential architecture, which was razed to

make space for new construction (S. Pozorski and T. Pozorski 1994).

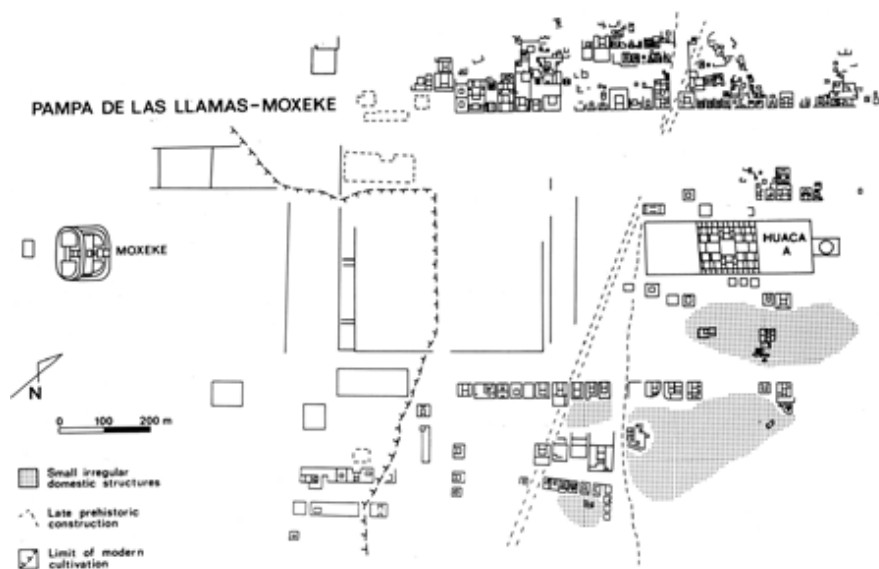


Figure 5.3 Plan of Pampa de las Llamas-Moxeke showing location of Moxeke, Huaca A, intermediate architecture and domestic architecture.

The single most outstanding feature of the Sechín Alto Polity is the magnitude of its public construction that took the form of flat-topped platform mounds or *huacas* that supported elaborate summit architecture and large associated plazas. Such manifestations of conspicuous consumption have been cited as universally understood expressions of power (Trigger 1990; Renfrew 1973), and the main mound at Sechín Alto site would seem to be an excellent example. It measures 300 by 250 meters in area and 35 meters tall, making it the largest structure in the New World when it was constructed, about 1500 BC. Some two million cubic meters of stone, cone-shaped adobes, and mortar were put up in only two or three massive construction phases. Facing stones measuring 100 to 150 centimeters on a side and weighing up to 4.5 tons would have involved a well-coordinated labor force to quarry, shape, and transport them to the site (T. Pozorski and S. Pozorski 2012). Other sites also contain large mounds, and our excavations at several of these mounds revealed that they served complementary functions. Moxeke mound at Pampa de las Llamas-Moxeke functioned as a temple, while Huaca A at the same site served as a huge warehouse. The main mound at Taukachi-Konkán was the likely palace or royal residence of the polity ruler, while the main Sechín Alto mound housed both secular administrative areas and a sacred precinct. Large plazas are associated with each of these mounds, especially Moxeke and the Sechín Alto main mound,

both of which had massive public-oriented friezes. The four plazas extending out from the main Sechín Alto mound have a combined area of more than 400,000 square meters, and the two large plazas in front of Moxeke mound cover an area of more than 300,000 square meters (Figures 5.2 and 5.3; T. Pozorski and S. Pozorski 2012). Thousands of people could have assembled within the plazas for public demonstrations and ceremonies that cultivated their sense of personal involvement in polity affairs. The unusually strong, powerful, and effective leadership of the Sechín Alto Polity may be attributable to the fact that member sites were bound together through the complementary functions of their component mounds.

The Sechín Alto Polity was supported by a combination of plants cultivated through irrigation agriculture and marine protein derived from the nearby ocean. Inland sites were located at optimum locations for canal intakes and, except for the polity center of Sechín Alto site, were situated outside the limits of prehistoric cultivation. Useful cultivated plants were abundant and varied and included the industrial plants of cotton and gourd and numerous food plants: squash, common beans, lima beans, *Canavalia* beans, avocado, guava, *paca* (a tree legume), *lúcuma* (a tree fruit), peanut, potatoes, sweet potatoes, and *achira* (a starchy tuber), but no maize. A subsistence exchange system was in effect whereby the three coastal satellites, under the supervision of Bahía Seca, furnished the inland centers with fish and shellfish in exchange for agricultural products produced by the inland sites (S. Pozorski and T. Pozorski 1987). Anchovies, sardines, and additional larger fish species are prominent among the marine products along with large mussels, scallops, and clams. Clearly the much larger inland sites were the dominant members of this partnership.

Storage within the Sechín Alto Polity

The best evidence for specialized storage structures comes from Pampa de las Llamas-Moxeke where the large mound of Huaca A functioned as a huge warehouse. Its summit, which exhibits four-way symmetry, is covered by thirty-eight examples of a modular room form that we describe as a square-room unit (Figure 5.4; S. Pozorski and T. Pozorski 1992, 1994, 2011). Typical square-room units are near-perfect squares and are characterized by rounded exterior corners; rounded or square interior corners; nine to sixteen high wall niches; floors carpeted with reed matting; and entrances with raised thresholds, paired pilasters that narrow the entrance, and a sliding-bar closure mechanism to further restrict access. What makes these square-room units unique is the modular nature of their construction.

Each is a freestanding structure with well-finished interior and exterior walls. Adjacent rooms are often separated by only a few centimeters of space, yet there are no shared walls. Larger “negative” spaces between room modules serve as access corridors as evidenced by their lack of carpeting and wear from foot traffic.

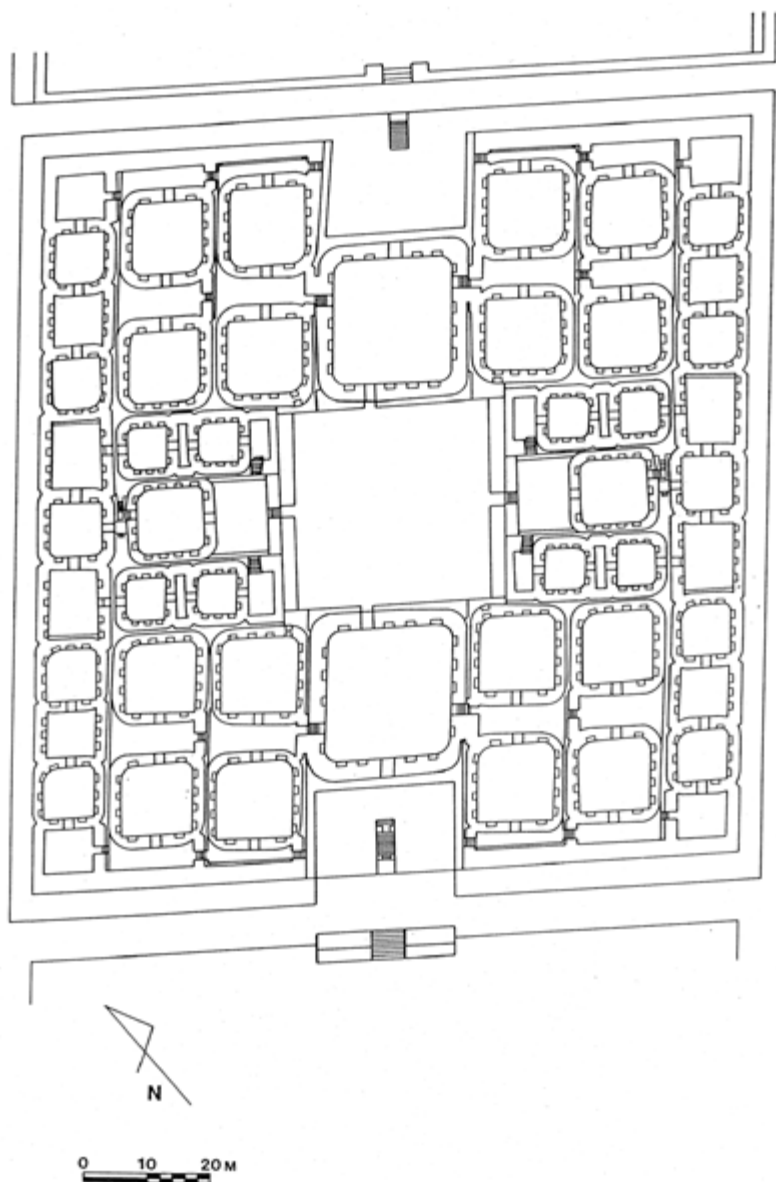


Figure 5.4 Plan of Huaca A at Pampa de las Llamas-Moxeke showing the construction symmetry and the presence of thirty-eight square-room units.

The square-room units, like much formal architecture, were remarkably clean and free of artifacts. Nevertheless, three lines of

evidence support our interpretation of Huaca A as a storage structure and the modular square-room units as storerooms. Pollen samples collected from square-room unit floors and niches yielded evidence of cotton, common beans, lima beans, squash, potato, peanuts, and avocado. Lima beans and potatoes in particular produce pollen that does not disperse widely, a further indication that the plants were actually present. A second line of evidence that argues for a storage function for the square-room-unit modules is the presence of thousands of rodent bones on niche and room floors. Remains of rats (*Oryzomys* sp.) and a few mice (*Phyllotis* sp.) were very common, often as whole articulated skeletons lying on niche floors, room floors, and on staircases. Based on minimum numbers of individuals from excavated contexts, we estimate that more than five thousand individual rodents may have died on Huaca A. This suggests that problems with these pests were endemic while the *huaca* was well stocked with food reserves. However, once the site was abandoned and the residual food exhausted, the trapped rodents perished in situ. Finally, some niches contained fragments of cloth. This may indicate that cloth was stored and/or that food or other valuables were stored in cloth containers.

The value of the comestibles and other products stored on Huaca A is reflected by the fact that access to the modular storage facilities was severely restricted (S. Pozorski and T. Pozorski 1994). The “front” entrance of one of the two largest square-room units on Huaca A was barricaded by stacked logs, and all other square-room-unit entrances were narrowed by pilasters and could be blocked by one or more sliding-bar closure mechanisms. These bar-closure mechanisms consisted of pairs of small, generally square, opposing niches, one relatively shallow (ca. fifty centimeters) and the other very deep (often two meters or more; see [Figure 5.5](#)). This design allowed a wooden bar to be drawn across the entrance to rest in the shallow niche to impede access or retracted into the deep niche to allow passage through the entrance. The system of bar-closure mechanisms on Huaca A was elaborate and even redundant at times. Where movement between square-room-unit modules involved an elevation change accomplished through stair steps, two bar-closure mechanisms were usually present, aligned vertically but at different heights above the steps. The height of the higher bar was appropriate to stop traffic *descending* the staircase, whereas the height of the lower bar was appropriate to stop traffic *ascending* the staircase. Some bar closures could be locked closed through the use of a second bar that was inserted behind the extended bar through a long niche perpendicular to and intersecting the bar-closure niche ([Figure 5.5](#)). Redundancy is also evident where two adjacent modules have aligned entrances

because both entrances have their own set of pilasters and accompanying bar-closure mechanisms.



Figure 5.5 View of a staircase on Huaca A showing two niches of two bar closure mechanism in the sidewall of the staircase. Also present is another niche on the right that held a third pole that served as a lock for the lower bar closure mechanism.

Other Square-Room-Unit Modules at Pampa de las Llamas-Moxeke

We believe that the square-room-unit module is much more than a storeroom because its distribution is not confined to Huaca A, and its function is not limited to storage. Many additional examples occur at Pampa de las Llamas-Moxeke and at other Sechín Alto Polity sites where they served varied administrative functions and also likely symbolized polity authority. Seven compounds scattered within the space on either side of Huaca A are actually freestanding square-room units complete with wall niches and bar-closure mechanisms. We interpret these compounds as administrative in function, serving to monitor the flow of goods to and from the Huaca A storage facility (Figure 5.3; S. Pozorski and T. Pozorski 1991).

More than eighty-five additional examples of square-room unit modules form the central rooms of intermediate-size mounds at Pampa de las Llamas-Moxeke. Each mound is like a miniature version of Huaca A, with a central staircase, an atrium, wing rooms, and a single square-room unit at its center. The central square-room units consistently form the tallest part of each mound, and their walls are typically thicker than the walls of associated architecture that abuts

but is not bonded into them. All these intermediate-size mounds lie outside the zone of compounds, and most are arranged in rows aligned in accord with the site axis. Exceptions are oriented toward roads that enter the site from the east and west. The aligned mounds probably functioned administratively, possibly to monitor production and transport of goods entering the site from specific locations within the valley, while the roadside mounds may have regulated intersite movement of goods and people (S. Pozorski and T. Pozorski 1987, 1991, 1994). Partial clearing of a sample of these intermediate-sized mounds revealed them to be remarkably clean—without evidence of habitation or ritual activities. Among the few artifacts recovered are fragments of stamp and cylinder seals made of pottery, which may have served an administrative purpose.

At least one square-room unit is also present within the irregular low-status residential architecture on the eastern side of Pampa de las Llamas-Moxeke (Figure 5.6). It forms the center of a full-size administrative structure that likely functioned to oversee cottage industry through which products such as textiles (Figure 5.7) and stone mortars and pestles (Figure 5.8) were manufactured.

Finally, a possible square-room unit or a variant without wall niches forms the central room of the Moxeke mound that faces Huaca A and helps establish the site axis for Pampa de las Llamas-Moxeke. We believe this mound functioned as a temple because of the immense anthropomorphic friezes that once adorned its façade and would have been highly visible from the large plazas in front of the mound. Initially excavated by Tello (1956: 60–64), the square-room unit at the mound center has subsequently been badly damaged by weathering and looting on the mound summit.

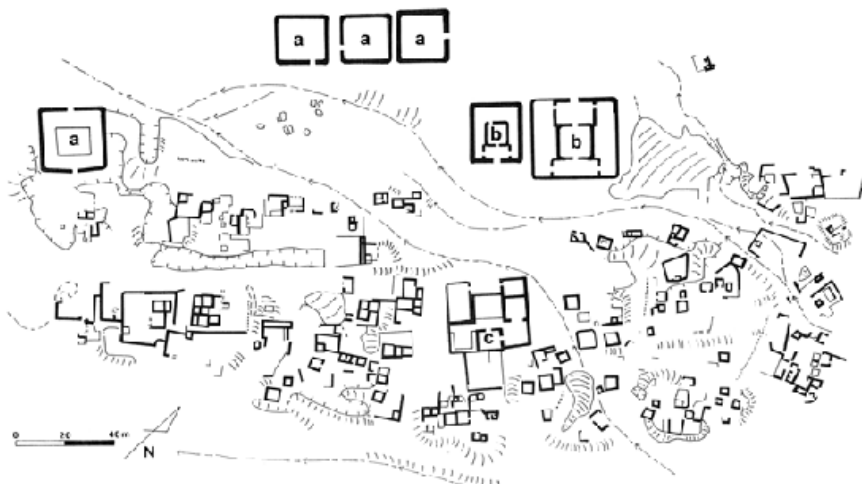


Figure 5.6 Detailed plan of the area east of Huaca A showing square-room units (a)

as compounds, (b) within intermediate architecture along the plaza northeast of Huaca A, and (c) within intermediate architecture located in a zone of domestic structures.



Figure 5.7 Cotton seeds, stems, and boll parts found in domestic housing areas along with cotton skins and ceramic spindle whorls, all of which indicate the presence of textile production.



Figure 5.8 Stone bowl and mortar fragments found in domestic and midden areas of Pampa de las Llamas-Moxeke.

The Square-Room-Unit Module at Other Sechín Alto Polity Sites

Outside Pampa de las Llamas-Moxeke, the best-preserved examples of square-room-unit modules were excavated at Taukachi-Konkán within the Sechín Alto Complex (Figure 5.9). Examples are present on the large Mound of the Columns at the west end of the site (Figure 5.10a), which establishes the site axis and as central rooms of intermediate-size mounds facing the site center. Complementing the Moxeke temple and the Huaca A storage structure, the main mound at Taukachi-Konkán is interpreted as a palace or royal residence (S. Pozorski and T. Pozorski 1998; T. Pozorski and S. Pozorski 1999a, 1999b). This function is assigned based on the juxtaposition of a clean, symmetrical, well-plastered, and roofed public area with formal areas suitable for receiving important visitors and a contrasting residential area with an irregular layout, sleeping and sitting platforms, and food remains. Examples of the square-room unit on the Taukachi-Konkán main mound reveal the adaptability of this architectural form. Units identical to examples from Huaca A were likely also used as storerooms—for goods given and received by the royal resident. A nearby variant has low wall niches suitable for use as benches during audiences, thereby serving a more public function.

Excavations have been conducted by other investigators at the Sechín Alto Complex sites of Cerro Sechín and Sechín Bajo where square-room units and variant forms are also present. The central

room with painted jaguars at Cerro Sechín is a round-cornered room that apparently lacks niches; and the outer façade, famous for its stone carvings, has a similar form (Collier 1962; Fuchs 1997; Maldonado 1992; Richardson 1994: 69; Samaniego 1973, 1995; Samaniego, Vergara, and Bischof 1985; Tello 1943). Squareroom-unit modules identical to examples at Huaca A have been cleared by Peter Fuchs at Sechín Bajo (Fuchs et al. 2006).

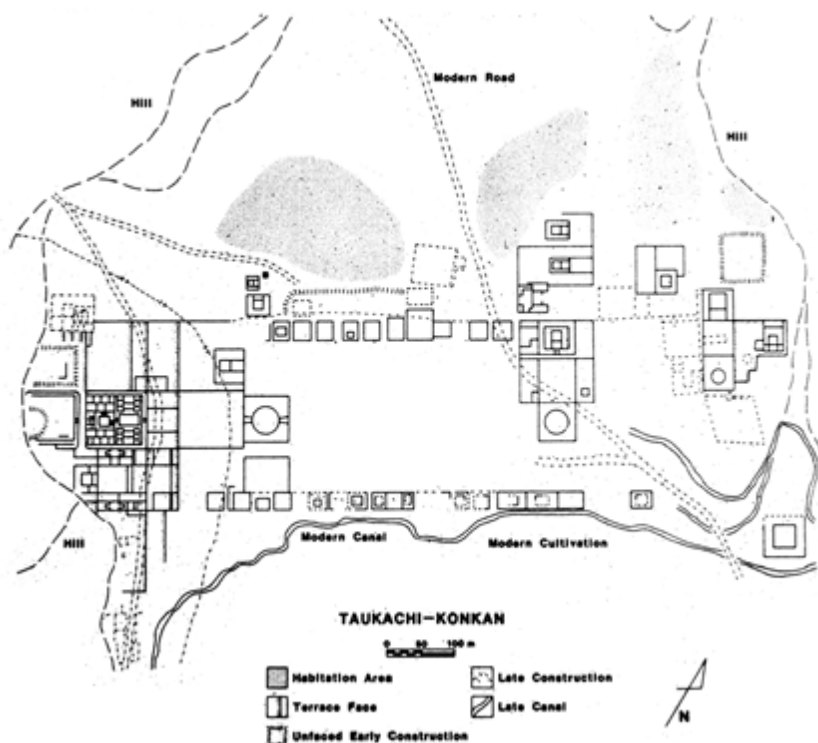


Figure 5.9 Plan of Taukachi-Konkán showing the location of the Mound of the Columns on the west of the mound.

The Sechín Alto site is very similar to both Pampa de las Llamas-Moxeke and Taukachi-Konkán because its main mound establishes the site axis and overlooked a series of plazas bordered by aligned intermediate-size mounds that face the site center. Unfortunately, much of the Initial Period architecture on the mound surface has been destroyed or obscured by later intrusive Early Horizon (1000–200 BC) use of the summit. Nevertheless, excavations that exposed Initial Period architecture revealed that the main Sechín Alto site mound likely functioned as an administrative center. A possible audience area was exposed as well as the remains of a central sacred precinct accessible only by way of a narrow corridor (T. Pozorski and S. Pozorski 2005). Deep excavations within a filled room also revealed a

partial square-room unit pertaining to an earlier Initial Period construction phase. Because this architecture was covered by later Initial Period fill, remnants of the original wall colors were preserved, indicating that this square-room unit and nearby associated structures were originally brightly painted in yellow, black, red, and white.

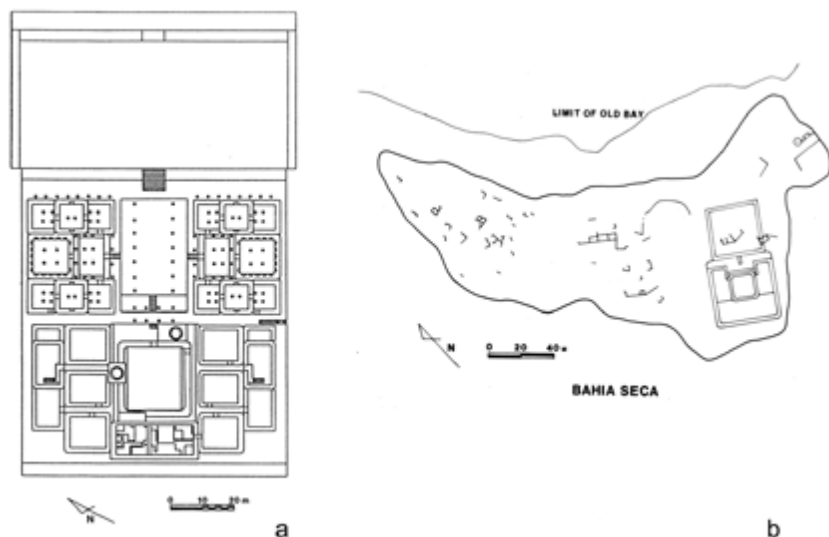


Figure 5.10 (a) Plan of the Mound of the Columns at Taukachi-Konkán showing the presence of square-room units; (b) plan of Bahía Seca showing the presence of an intermediate-size mound similar to those found at Pampa de las Llamas-Moxeke.

A final example of square-room-unit architecture is present at the coastal site of Bahía Seca (Figure 5.10b) where it forms the central room of an intermediate-sized mound virtually identical to examples at Pampa de las Llamas-Moxeke and other inland Sechín Alto Polity sites (S. Pozorski and T. Pozorski 1992). Like its counterparts at the inland sites, this square-room unit likely functioned administratively. In this capacity, Bahía Seca would have functioned to supervise procurement and possibly processing of marine resources collected by the coastal satellites and to insure their delivery to inland polity centers.

The Square-Room Unit as an Emblem of Control and Polity Authority

Based on the recurring presence and consistent form of the square-room unit and its constant use in administrative contexts within the Sechín Alto Polity, we suggest that this modular architectural form also functioned more broadly as a tangible symbol of the power and control exerted by Sechín Alto Polity leaders. The clear connection of many examples of the square-room unit with storage may reflect the

importance of both storage and access limitations to stored commodities as key features of the polity's power base. Modular square-room units or variants also occur in other administrative contexts, however, such as the audience rooms at *Taukachi-Konkán*, the compounds near *Huaca A* at *Pampa de las Llamas-Moxeke*, and the central rooms at *Moxeke* and *Cerro Sechín*. The presence of an intermediate mound with a square-room unit at its center at *Bahía Seca* on the coast reveals that the “reach” of this icon and the power it symbolized extended well beyond the valley interior.

Taking this idea a step further, we also propose that a set of frequently used symbols within *Sechín Alto* Polity iconography may depict this standardized architectural form in its capacity as a power symbol. These symbols occur in friezes on *Huaca A* at *Pampa de las Llamas-Moxeke*, as part of the warriors' gear on the carved stone façade of *Cerro Sechín*, and on a stone mortar fragment from a private collection.

We have interpreted the frieze within the north atrium of *Huaca A* as a pair of immense jaguars facing each other across the principal entrance to the mound ([Figure 5.11](#); S. Pozorski and T. Pozorski 1992). On either side of the entrance, and immediately in front of each jaguar, is a pair of prominent circular designs. The central part of this design is a circle with four rectangles spaced evenly around its perimeter ([Figure 5.11a](#)). We believe this design is a depiction of the square-room unit, with its wall niches represented by the evenly spaced rectangles. In this context, as part of the polity iconography, the square-room unit modular architectural form is abstracted into an emblem of power and authority. The frieze within the south atrium of *Huaca A* is poorly preserved, but enough remains to determine that it is different from the north frieze (T. Pozorski and S. Pozorski 1993). Within the iconography, however, are three designs that may represent the square-room-unit power symbol. The shape of the south-frieze symbols is more square with rounded corners so that the form looks more like a square-room unit; the rectangles, believed to represent niches, are well within the borders rather than at the perimeter.

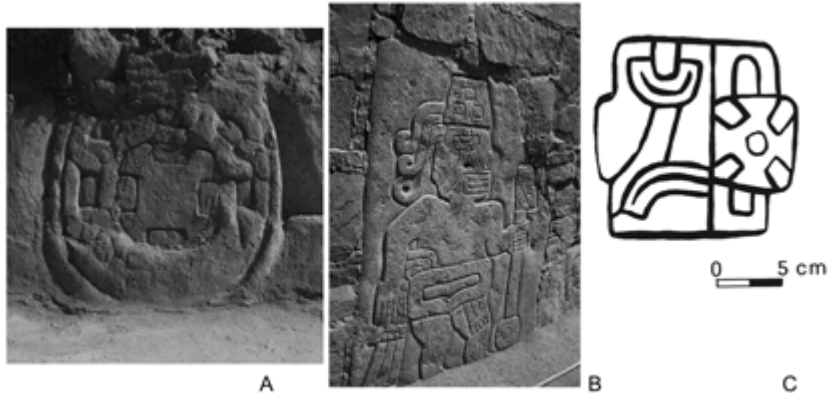


Figure 5.11 (a) View of the power symbol on the clay frieze located in the north atrium of Huaca A at Pampa de las Llamas-Moxeke; (b) view of one of the warrior figures at Cerro Sechín holding a club that contains a power symbol at its distal end; (c) drawing of a Sechín-style face coupled with a power symbol, carved on a stone mortar found in the Pan de Azúcar sector of the Casma Valley. Redrawn after León (1995: fig. 2).

We have also identified possible square-room-unit power symbols on the carved stone façade of Cerro Sechín within the Sechín Alto Complex (Cárdenas 1995). Circles with perimeter rectangles there are virtually identical to the Huaca A north atrium examples. They form the lower end of the staffs or clubs held by most of the intact figures generally interpreted as warriors (Figure 5.11b). At least sixteen Cerro Sechín warriors carry these clubs (Moseley 1992: 142) and occupy prominent positions within the procession of beings and body parts depicted on the façade, including positions flanking both the front and rear entrances to the square-room-unit module variant decorated by the carvings.

A final example of iconography containing the square-room-unit power and authority symbol documents its use on portable media and brings together the symbols of power and ruling personages. This depiction is on a stone mortar fragment from a private collection, reported to be from the Pan de Azúcar sector of the Casma Valley (Figure 5.11c; León 1995: figs. 2, 4). On this mortar, the power symbol comprises the right half of a dual design. The left half is a partial face with a wide vertical band crossing the eye zone. This form of facial decoration is commonly seen on important personages within Casma, including the Cerro Sechín warriors (Cárdenas 1995) and one of the colossal faces that adorn the Moxeke mound at Pampa de las Llamas-Moxeke (Tello 1956: fig. 31). The dual image on the mortar seems to represent a melding of the power symbol with the actual personage who wielded power.

Artifacts and Bureaucracy

Two classes of artifacts may be associated with the activities of the far-reaching bureaucracy of the Sechín Alto Polity. These include both cylinder and stamp seals as well as figurines—all made of fired clay. More than a dozen examples of seals were recovered from administrative contexts at Pampa de las Llamas-Moxeke, where they were likely used, and from midden contexts within the Sechín Alto Complex, where they were likely manufactured.

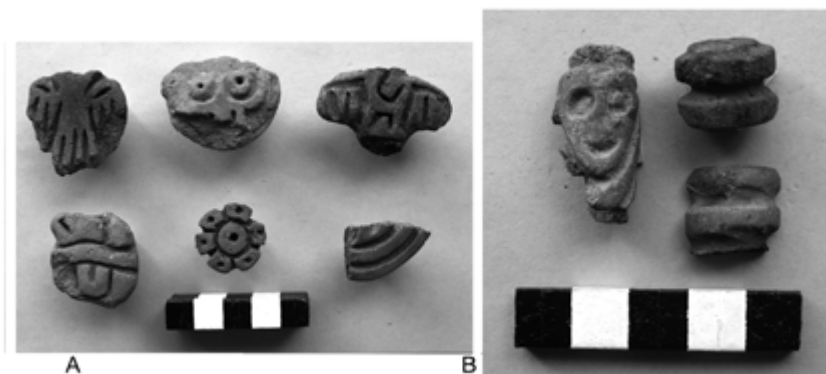


Figure 5.12 (a) Ceramic stamp seals found in the midden of Sechín Alto site; (b) ceramic cylinder seals found in the midden of Sechín Alto site.

Both types of seals were made using a combination of modeling and incision, and both types show a wide range of variation ([Figure 5.12](#)). The only duplication is a pair of stamp seals with an S-shaped design (S. Pozorski and T. Pozorski 1986). Other fragmentary examples are geometric, one intact example resembles a flower, and another may be a bird, while several others seem representational, but their designs cannot be discerned. Cylinder seals also exhibit both abstract and representational designs. One abstract example would have produced parallel horizontal lines, while another would have been used to apply a repetitive pattern with faces. Red pigment residue is still present within the grooves of several examples of both types, indicating they were used to apply this substance, perhaps to textiles or human skin. This makes the Casma Valley examples different from Near Eastern versions, which were locks used primarily to impress designs in soft clay (Collon 1990; Rothman and Fiandra, [Chapter 2](#), this volume). Nevertheless, the cylinder and stamp seals apparently served the same purpose as those in the Near East—as symbols of authority and ownership (Collon 1990: 11; Foster and Foster 2009: 25; Lloyd 1987: 39; Maisels 2003: 146).

Human figurines are more numerous and consistent in form than

the stamp and cylinder seals (S. Pozorski and T. Pozorski 1998). More than four hundred fragments have been recovered from Sechín Alto Polity sites (Figure 5.13; T. Pozorski and S. Pozorski 2012). These solid hand-modeled androgynous figures are typically twelve to fifteen centimeters tall, and their features were created using incision, punctuation, and appliqué. Eyes are formed by making a deep horizontal incision, inserting a bead of clay to form the eyeball, and adding a deep punctuation for the iris. Ears are modeled or attached as appliqué, and internal features are defined by incision and punctuation (earhole). Noses are modeled or applied separately, and deep punctations define the nostrils, while mouths are made by a series of deep horizontal punctations. The two options for head treatment include fez-like caps and appliqué locks of long hair defined by incision. Appliqué bands decorated with punctations and incisions form collars at the head/torso join. Belts or loincloths, defined by appliqué and/or incision, are occasionally present in the abdomen area. The chest is always bare, with the arms are folded across the torso. Perforations under both armpits of most figures may have served to suspend the figures or attach them to something. Legs are always conjoined and defined front and back by deep incisions that may extend across the figure's base to separate the feet. Four toes are usually demarcated on each foot by single incised lines. Figurine bases are uniformly flat or concave so that the figures stand well.



Figure 5.13 Ceramic figurines shown with (a) caps and (b) long hair. Each of these types may be representative of two different elite groups within the Sechín Alto Polity.

Elements of the figurines' features can be related to Sechín Alto

Polity iconography at both Cerro Sechín and Moxeke at Pampa de las Llamas-Moxeke. The figurines with caps and belts or loincloths may represent the same personages as the Cerro Sechín stone carvings of warriors, who wear similar clothing and caps, and these in turn may connect with the colossal heads at Moxeke because of similar face paint. The bareheaded figurines, in contrast, may connect with the bare-headed victims with prominent hair at Cerro Sechín, who can be related to the large standing figures at Moxeke based on their clothing, which is characterized by pleated skirts and scalloped tunics. Taken collectively, the iconography of the Sechín Alto Polity reflects bureaucracy both literally and figuratively. Based on clothing, face paint, and hairstyles, it is possible to distinguish two groups of important personages. One type is depicted in the standing figures of Moxeke, the victims at Cerro Sechín, and possibly the bare-headed figurines, while the second is represented by the colossal heads of Moxeke, the warriors at Cerro Sechín, and the figurines with fez-like caps. The prominence and frontal pose of the standing figures on the Moxeke temple, a religious structure (Tello 1956), contrasts with the warlike attributes and stance of the Cerro Sechín warriors (Cárdenas 1995), suggesting that the two groups may have had distinct functions and power bases within Sechín Alto Polity society. More abstractly, the high degree of standardization of the figurines and the Cerro Sechín carvings also documents the far-reaching impact of Sechín Alto Polity bureaucracy because artistic license was apparently quite limited.

Conclusions

In this chapter, we have attempted to highlight both similarities and differences between Andean examples of bureaucracy as represented in the archaeological record and examples from other parts of the world. Many features are comparable, including the construction of monumental architecture, the use of large areas of storerooms to which access was restricted (T. Pozorski and S. Pozorski 2012) and the use of devices such as seals that relate to bureaucratic activities. However, the Sechín Alto Polity within the Casma Valley took most of these concepts to an extreme. The polity overbuilt its monumental architecture to create platform mounds without rival in the New World. There is no obvious ecological explanation for the magnitude of Sechín Alto Polity development, so we must look internally to understand its Initial Period florescence. Several factors appear critical to the polity's success. Evidently a strong, charismatic leadership emerged who was likely inspired by similar but earlier Preceramic manifestations of social complexity and power in valleys to the south

(Haas and Creamer 2004, 2006; Haas, Creamer, and Ruiz 2004, 2005; Ruiz, Creamer, and Haas 2007; Shady 1997, 2001, 2006, 2007a, 2007b; Vega Centeno et al. 1998). Borrowing ideas of structure symmetry, mounds with associated plazas, irrigation agriculture, and coastal/inland subsistence exchange, Sechín Alto Polity leaders used their preconceived plan to create a more elaborate and advanced society within the Casma Valley. Feelings of rivalry may help explain the magnitude of construction within Casma because similar political units appeared in most north coast valleys at about this time (Ruiz, Creamer, and Haas 2007).

The heavy hand of Sechín Alto Polity leadership is readily evident. Sechín Alto site, the polity capital, asserts its power by both the magnitude of its construction and its location on arable land. Precise planning is also evident among sites of the Sechín Alto Complex as manifested by their shared orientation and within individual sites as evidenced by symmetry and layouts that are quite similar from site to site. These preconceived site plans were transmitted through several generations as revealed by Pampa de las Llamas-Moxeke, where rows of aligned mounds were constructed and filled in, often at the expense of extant residential architecture, which was destroyed in the process. Within each component site, the square-room-unit architectural form served tangibly for storage and, by extension, for administration associated with products and their storage. However, this modular architectural form also became an icon that symbolized the power behind the leadership of the Sechín Alto Polity. The presence of square-room-unit modules within residential zones characterized by cottage industry documents, efforts to control production, and polity iconography appears similarly restricted. Such overall standardization in architecture, artifacts, and iconography reflects restricted norms with respect to artistic expression.

But how were Sechín Alto Polity leaders able to exert such control and motivate citizens to create such impressive public works? The presence of square-room-unit modules at Bahia Seca and in contexts related to intersite movement and storage of comestibles at Pampa de las Llamas-Moxeke suggests that control of subsistence may have been critical. These stored commodities may have given polity leaders leverage as they assembled and provided for large work forces. At the same time, the immense plazas and public-oriented friezes at polity sites document the complementary role of community involvement and inspiration connected with public events and ceremonies. Furthermore, the complementary functions of the major mounds at component polity sites—as the polity administrative center, as a temple, as a warehouse, and as a palace—would have fostered a

strong sense of social solidarity and polity unity because each component clearly served a vital role. This constructed interdependence among components enabled the entire Sechín Alto Polity to function as a highly unified social, political, and economic entity rather than as a collection of discrete sites and was likely critical to its effectiveness. Based on the Casma Valley example, it seems necessary to examine both commonalities and differences among societies with well-developed bureaucracies in order to more fully understand the development and maintenance of these complex societies worldwide.

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STOREROOMS, TOKENS, AND ADMINISTRATIVE DEVICES: AN ANDEAN CASE STUDY

John R. Topic

Introduction

Over the past few years, one of my interests has been focused on how information recording systems developed in the Andes. In other areas of the world, information-recording systems are usually based on words in some way or another. This does not seem to be the case in the Andes, where the ability to actually record texts in any formal fashion is something that has never been conclusively demonstrated. But Andean people did develop very sophisticated data-recording systems.

These Andean data-recording systems generally emphasized the recording of numerical information, with nonnumerical qualifiers that provided context for what the numbers represented. It is this combination of numbers and qualifiers that I focus on in this chapter. The recording of numbers is relatively straightforward, but how Andean people recorded the qualifiers is more variable and interesting.

I first provide some background information on the *quipu*, the record-keeping device used by the Inkas. I then describe an earlier device used by the Chimú (ca. AD 850–1470) that was based on a specific form of architecture combined with the use of tokens for recording information. The Chimú device is closely associated with large numbers of storage complexes. As Rothman ([Chapter 1](#)) points out, storage can be considered a useful marker for comparing cultures at different times and scales. I explore how the arrangements of storage complexes among the Inka and the Chimú contributed to the recording of information about the materials stored and possibly also reflect aspects of community, economic, and political organization.

Background

The best-known Andean record-keeping device is the *quipu* (Ascher and Ascher 1981; Locke 1923; Mackey 1970; Mackey et al. 1990;

Radicati di Primeglio 1979; Urton 2001). *Quipu* are record-keeping devices made of strings or yarns, usually with a long header string to which knotted pendent strings are attached (Figure 6.1).

The *quipu* could record numbers, but it is a mnemonic device (a memory aid); hence, like other New World recording methods, it was not designed to precisely record speech (Boone 1994; Mignolo 1994: 229). The *quipucamayoc* (official who kept and read the *quipu*) needed to remember what each string signified, but if he knew what the string signified he could read the numbers off it readily. The numbers were recorded by different kinds of knots and the order of magnitude (one, ten, one hundred, one thousand, and so on) was indicated by the location of the knot on the string (Cieza de León 1985 [1553]: 330; Garcilaso de la Vega 1966 [1609 and 1617]: 330).

The basic structural characteristics of the *quipu*, then, consist of numeric values recorded in a particular position on a string and those positions have predefined values. The basic structure of the *quipu* informational system was augmented by a few other characteristics. First, a number of strings could be combined into a single larger *quipu* in order to record different categories of things within a single *quipu* record (see Figure 6.1). To facilitate remembering the different categories represented by each string, they were sometimes coded by color, the direction the string had been spun, the thickness of the string, and so forth. (Calancha 1974–82 [1638]: 203–206; Garcilaso de la Vega 1966 [1609 and 1617]; Mackey 1970: chaps. 2 and 6). Tus, nonnumeric qualifiers provide the context for understanding the recorded numeric values.

Moreover, at least by late Inka times, the categories recorded on a series of strings within a *quipu* were organized in a standard order based on the relative importance of the items (Calancha 1974–82 [1638]: 204–205; Garcilaso de la Vega 1966 [1609 and 1617]: 330; Mackey 1970; Murra 1975, 1982). This correlation of cognitive ranking with the sequential ordering of the strings again emphasizes the structural importance of the place or position, with predefined value, in which numbers are recorded. However, the significance of the positions and qualifiers has to be learned and communicated from one bureaucrat to another; they are not inherent in the sense that an S-spun brown cotton string, in the third position on a larger *quipu*, will always record information about the same category of thing.

Quipu were in use as early as AD 700 in the Central Andes but the early *quipu* are quite different from the *quipu* generally associated with the Inka. The most striking characteristic of the early quipus is that the primary pendant cords are wrapped with yarn, usually at the top of the pendant near the transverse cord (Conklin 1982; Pereyra-

Sánchez 1997; Radicati di Primeglio 1990). These “wrapped *quipu*” or *quipu de canutos* also usually use only simple knots (for exceptions, cf. Pereyra-Sánchez 1997: 194; Radicati di Primeglio 1990: 45), rather than the combination of simple and long knots normally used on Inka *quipu*. Moreover, knots occur on only some of the pendent cords; the published descriptions suggest that the number of knots on any cord is not very large, perhaps never exceeding ten. The one example analyzed in detail by Conklin (1982) seems to employ a combination of binary, base 5, and decimal numeric systems on different strings. Hugo Peyrera (1997: 196) notes that pre-Inka *quipu* lack the positional values for the knots on the pendant cords corresponding to units, tens, hundreds, and so on.



Figure 6.1 Inka officials with quipu. At the bottom left, an accountant is shown with his quipu and abacus (*yupana*). At the bottom right, an accountant is shown in a group of storerooms. From Guaman Poma de Ayala (1980 [1615]).

The context in which these early *quipus* were used is not known nor is it clear what kinds of information might have been encoded on them. Conklin (1982) suggests that the nature of the information recorded may have been astronomical or ritual; Radicati di Primeglio (1990: 46–48) suggests that the colors of the wrappings might represent the elements (water, fire, earth, metal, and wood) or

personal names. These suggestions have little evidence to support them, but it is clear that the investigators who have worked on the early *quipu* consider their structure to be distinct from the better-known Inka *quipu* and the early *quipu* may have been used for different purposes than Inka *quipu* were. Conklin (1982) notes that the Inka *quipu* was the result of a long process of development. Unfortunately, however, since the pre-Inka *quipu* are mostly not provenienced or dated, the process of development cannot be traced in any detail.

On the other hand, it is clear that there was a certain amount of standardization among Inka *quipu*. For example, two basic kinds of *quipu* have been recognized: quantitative *quipu*, in which the numbers on different strings can be shown to be related to each other arithmetically (e.g., one string sums others), and *quipu* in which the numbers on the strings seem to serve as labels, rather than as arithmetic quantities (Ascher 1990). The knots themselves are standardized, so that there are usually only three different kinds of knots used and these are used preferentially to denote the units or the higher numbers. Moreover, sequences of color combinations recur frequently within a single *quipu* or within associated lots of *quipu*, demonstrating another form of standardization, at least within the *quipu* used by a single *quipucamayoc* (Mackey 1970: 76–77). It is these types of standardizations and patterns in the *quipu* that allow even modern researchers to be able to read the numbers and have a sense of the structure of the ancient *quipu*.

Other aspects of Andean record keeping were methods of gathering data and performing calculations. The Andean abacus, or *yupana*, illustrated by Guaman Poma (Poma de Ayala 1980 [1615]: 360) (see [Figure 6.1](#)) is interesting, because it is again based on the principle of representing numeric values in particular places or positions where those places have predefined values. Guaman Pomâs drawing shows a simple array of cells, consisting of five rows and four columns; the array of cells could simply be marked on the ground by drawing some lines in the dirt, drawn on a piece of cloth, or perhaps carved in wood or stone. Although there is some debate about exactly how the abacus functioned, it is clear that each cell had a numerical value and calculations were performed by moving tokens—a stone, bean, maize kernel, quinoa seed, and so on—from one cell to another; early historical accounts indicate that they could perform calculations from one to 100,000 (Acosta 1940 [1590]: 290–292; Poma de Ayala 1980 [1615]: 360[362]–361 [363]; Pereyra-Sánchez 1990; Wassén 1990).

Modern Andean peasants still keep track of herds and harvests by using simple counting and recording techniques. Potatoes and maize are counted in groups of ten, with one potato or ear set aside for each

group; then the tens are counted in the same manner, setting aside one potato or ear to represent a hundred, until a final figure is arrived at and recorded on a *quipu* (Núñez del Prado 1990). Larco Hoyle (1942: 100–101; 1943: 352) reported that beans of different types and colors are used to represent animals in a herd or the warps in a textile; again, the tokens (beans in this case) used by individual herders and weavers could later be recorded on *quipu*. However, in the first instance, the recording is easier to accomplish by using a physical object as a counter. Thus, for example, a herder counting sheep being herded into a corral might drop a stone (a token) into one pile for every female and into another for every male. The piles for males and females—places with predefined values—serve as nonnumerical qualifiers.

On the other hand, sometimes the qualifier is actually the thing that is being counted: Larco Hoyle (2001: 1:163), for example, gives ethnographic examples of grains of maize and beans representing multiples of themselves. Crops, like beans and maize, can be recorded using the corresponding kernels to represent sacks of produce. The maize kernels or the beans serve as tokens to represent larger quantities of the same commodity. On the other hand, beans, and other tokens, can easily represent commodities other than themselves. Again, Larco Hoyle (2001) gives an example where sheep can be represented by *chochos* (a lupine bean) and cows by *ñuñas* (a variety of common bean).

There are also examples of images used as qualifiers. One of the best examples is discussed by Margaret Jackson (2002), where scratched rudimentary images on the outside of ceramic molds indicate the design formed by the mold. On a similar line, we can point to the images (hands, feet, and so on) used as maker's marks on Moche bricks (Moseley 1975b) and the incisions used as maker's marks on some ceramics (Donnan 1971; Topic and Moseley 1985), or the possible use of cylinder seals (Pozorski and Pozorski, [Chapter 5](#), this volume).

Spatial Patterning as Information

One of the qualifiers, already mentioned with regard to both the *quipu* and the *yupana*, is the spatial dimension of place, location, or position. We are familiar with the value of place, and placeholders, in our own numerical system. This is paralleled in the positioning of knots in the *quipu* or the manipulation of tokens among the cells of the *yupana*. The placement of objects in space is one way to record information.

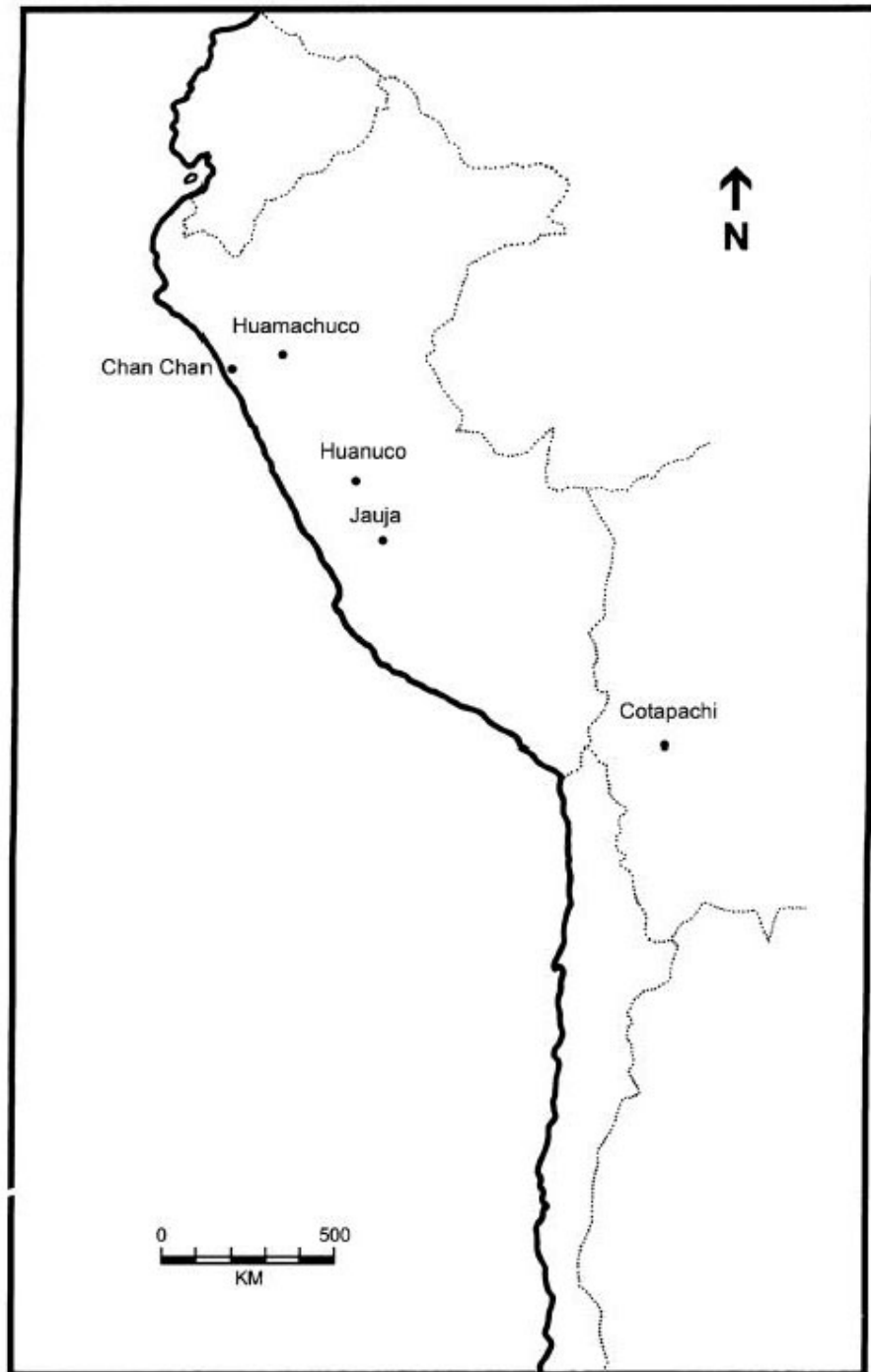


Figure 6.2 Sites discussed in this chapter. After Snead (1992).

Chimú Administrative Devices

In a previous article (Topic 2003), I argued that the earliest recognizable bureaucracy in the Andes developed at Chan Chan, the capital of the Chimú Kingdom (Figures 6.2 and 6.3). Chan Chan was probably first occupied about AD 850 and was conquered by the Inka about AD 1470. I am using the term *bureaucracy* in the Weberian sense of a form of administration in which fixed areas of jurisdiction are ordered by rules and regulations, resulting in a stable distribution of authority across a group of officials who are employed in their offices, because they have the requisite qualifications to fulfill their duties (Weber 1946: 232–239). The bureaucracy forms an administrative interface between the rulers and the ruled that acts as an agency of control, largely by controlling sources of information and communication.

The development of bureaucracy at Chan Chan can be traced archaeologically by examining the morphology and distribution of a special type of building referred to as an *audiencia* or U-shaped structure. These structures occur at a variety of Chimú sites, but they are especially common at Chan Chan, where they are concentrated in the palaces, which also housed large-scale storage. Most Chimú scholars have long believed that the *audiencias* were associated with the control or administration of storage, although Jerry Moore (1992) argued that the *audiencias* do not control access to the storage facilities either physically or by line of sight. My analysis (Topic 2003) examined the morphology and distribution of the *audiencias* chronologically. The analysis showed that during the early occupation at Chan Chan the *audiencias* were closely associated with storerooms and that the occupants of the *audiencias* would have functioned like stewards in close contact with the physical commodities for which they were responsible; during the late occupation at Chan Chan, however, the distribution and morphology of the *audiencias* had changed and their occupants now functioned as bureaucrats, controlling information about commodities that were spatially isolated from the *audiencias*.

The term *audiencia* is used here in a generic sense to encompass a set of structures, with varying characteristics, that include types referred to as *audiencia* variants, *arcones*, *trocaderos*, and *tablados* (Andrews 1974). These types of structures frequently have just three walls and are open on the fourth side, like a block letter *U*; sometimes, however, their layout is more like a block letter *C* (Figure 6.4). The interior floor of the *audiencia* is usually raised a bit above the floor of the surrounding court. *Audiencias* usually have a varying number of bins, troughs, or niches in their walls.

I hypothesized that the bins, niches, and troughs might have the

same sort of predefined place value that we see in the strings of the *quipu* or the cells of the *yupanas* (Topic 2003: 245–251). In a manner similar to the *yupana*, pebbles or beans or other tokens could be placed in the niches, bins, and troughs to record quantitative information. A bin or niche could represent a commodity in storage, or a commodity that was due to be delivered, or one that was due to be shipped out for some reason. Niches could have been subdivided, using cloth bags, ceramic bowls, or gourds, to add categories or subcategories much like the pendent strings on a *quipu*.

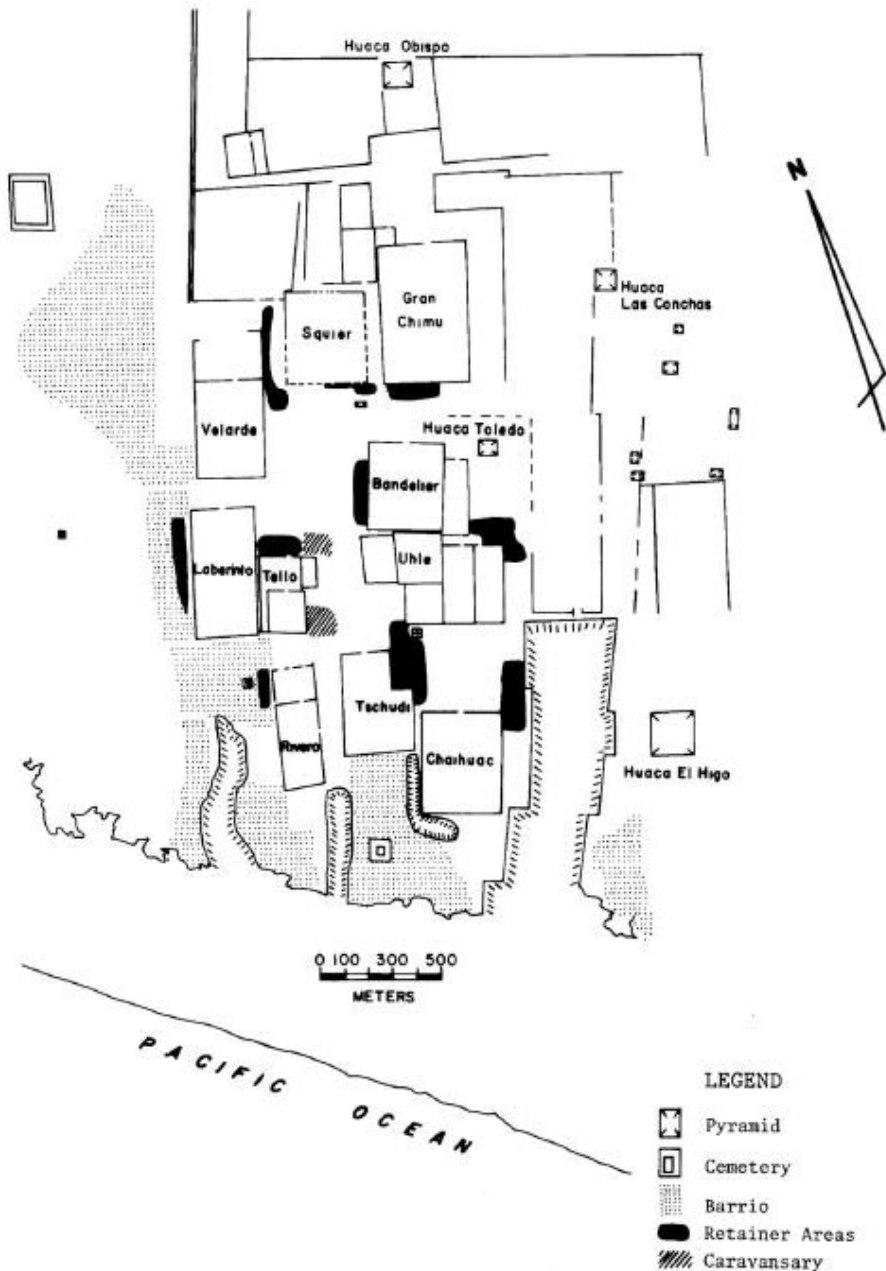


Figure 6.3 Basic plan of Chan Chan at the time of the Inka conquest (Topic and Moseley 1985).

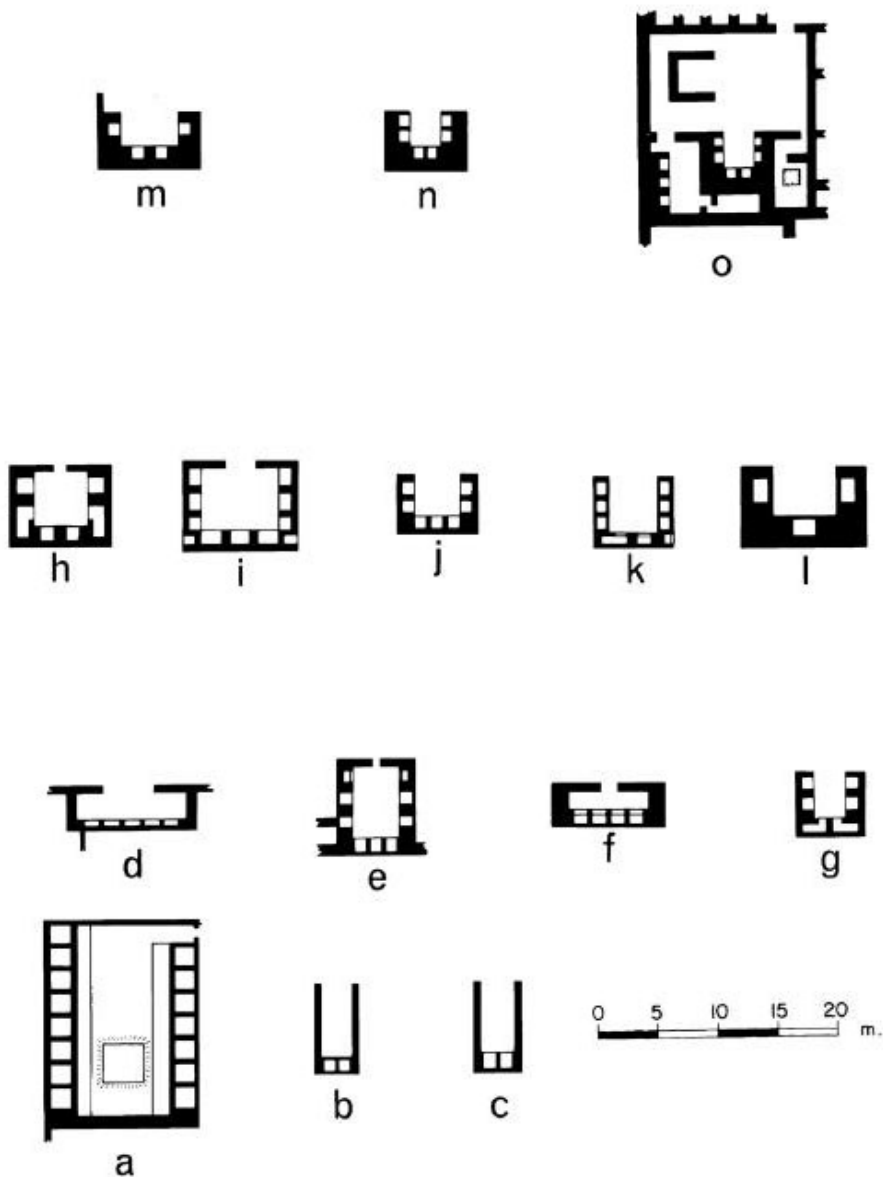


Figure 6.4 The *audiencias* or U-shaped structures in Chan Chan. Types a to g are Early; types h to l are Middle phase; types m to o are Late. From Topic (2003).

The validity of the analogy between the *audiencias* and *quipu* cannot be tested directly, but it can be shown that the analogy makes sense within a larger interpretation of the changing morphology and spatial distribution of the *audiencias*. The article presented four independent arguments to support the analogy (Topic 2003: 252–268).

The first argument had to do with the need for standardization in the way that information was being recorded and stored. A

bureaucracy with officials of fixed jurisdiction, controlling information, needs to share that information, or some of that information, between jurisdictions. To use a modern analogy, everyone should be using the same operating system. In the case of Chan Chan, if the form of the *audiencias*—the number and arrangement of niches, for example—is part of the operating system, then these have to become standardized as bureaucracy develops, and that is exactly what we see at Chan Chan. The early phase is characterized by a wide variety of *audiencias*, as [Figure 6.4](#) illustrates. There is a reduction in variation during the middle phase, and a high degree of standardization is evident in the late phase. In the late phase a single form with six niches dominates ([Figure 6.4n](#)). The patterning in the early phase is consistent with officials who are acting like stewards, idiosyncratically encoding information about the commodities entrusted to them. The *audiencias* in the late phase are consistent with a system in which bureaucrats are archiving information in a manner that is potentially readable by other bureaucrats. As noted above for the *quipu*, some degree of standardization is a precondition for the development of an information-recording system that can support a bureaucratic administration.

The documentation for the second argument is much more complicated (Topic 2003: 253–262). However, the essence of the argument is relatively straightforward: stewards will be in close association with storerooms while bureaucrats do not need to be as closely associated with the commodities they are administering, because they are really administering information about the commodities rather than the commodities themselves. The physical evidence of this shift is the increasing isolation of the administrative structures, the *audiencias*, from the storage complexes that they are administering. Moreover, through time the *audiencias* become increasingly associated with other *audiencias*, occurring in clusters that are physically isolated from the storage facilities. The clustering would facilitate communication between the officials occupying the *audiencias*; indeed, the implication is that late in the sequence officials are more concerned with exchanging information among themselves about the commodities stored than they are with physically monitoring the storage facilities.

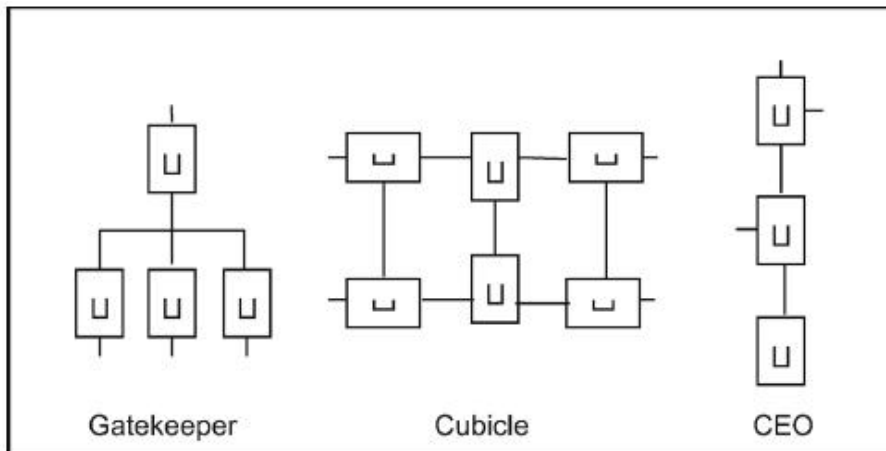


Figure 6.5 Tree possible arrangements of U-shaped structures that show hierarchical relationships. From Topic (2003).

The distancing of the *audiencias* from the storerooms is associated with an increasingly hierarchical arrangement of *audiencias*. The spatial distribution of the structures can be used to demonstrate these hierarchical relationships. I discussed three different spatial patterns that are related to increasing hierarchical relationships between the occupants of the *audiencias* (Topic 2003: 262–266) (Figure 6.5). One was the “CEO pattern,” in which several layers of lower-ranking officials protected access to their superior; a second was the “gatekeeper pattern,” in which one official controlled access to several other officials; and a third was the “cubical pattern,” in which a cluster of officials were apparently functioning as equals, but under the control of either a CEO or gatekeeper.

Finally, I argue that the spatial distribution of *audiencias* suggested a sophisticated rationalization of the bureaucracy during the final occupation of the site. Palaces were divided into functional sectors (Figure 6.6); the ratio of *audiencias* to storerooms was higher in the northern sectors of the palaces and lower in the central sectors of the palaces; and all three patterns of hierarchical organization were represented. This level of rationalization is only present in the last two palaces, which date to the period just before the Inka conquest (ca. AD 1425 to about AD 1470). This late pattern of *audiencia* distribution indicates a complexly organized set of officials with different jurisdictions, whose major function is the control of information.

Trough time, then, a number of trends can be traced that indicate the formation of a bureaucratic form of administration in the palaces at Chan Chan, each one of which served for a time as the center of the Chimú administration before it was replaced by a later palace. These

trends include the following: (1) standardization of the *audiencias*, indicating a standardization of accounting procedures; (2) an increasing spatial separation between the officials in charge of goods in the storage facilities and the goods themselves; (3) an increasing hierarchical organization; and (4) a reorganization or rationalization of the distribution of *audiencias*.

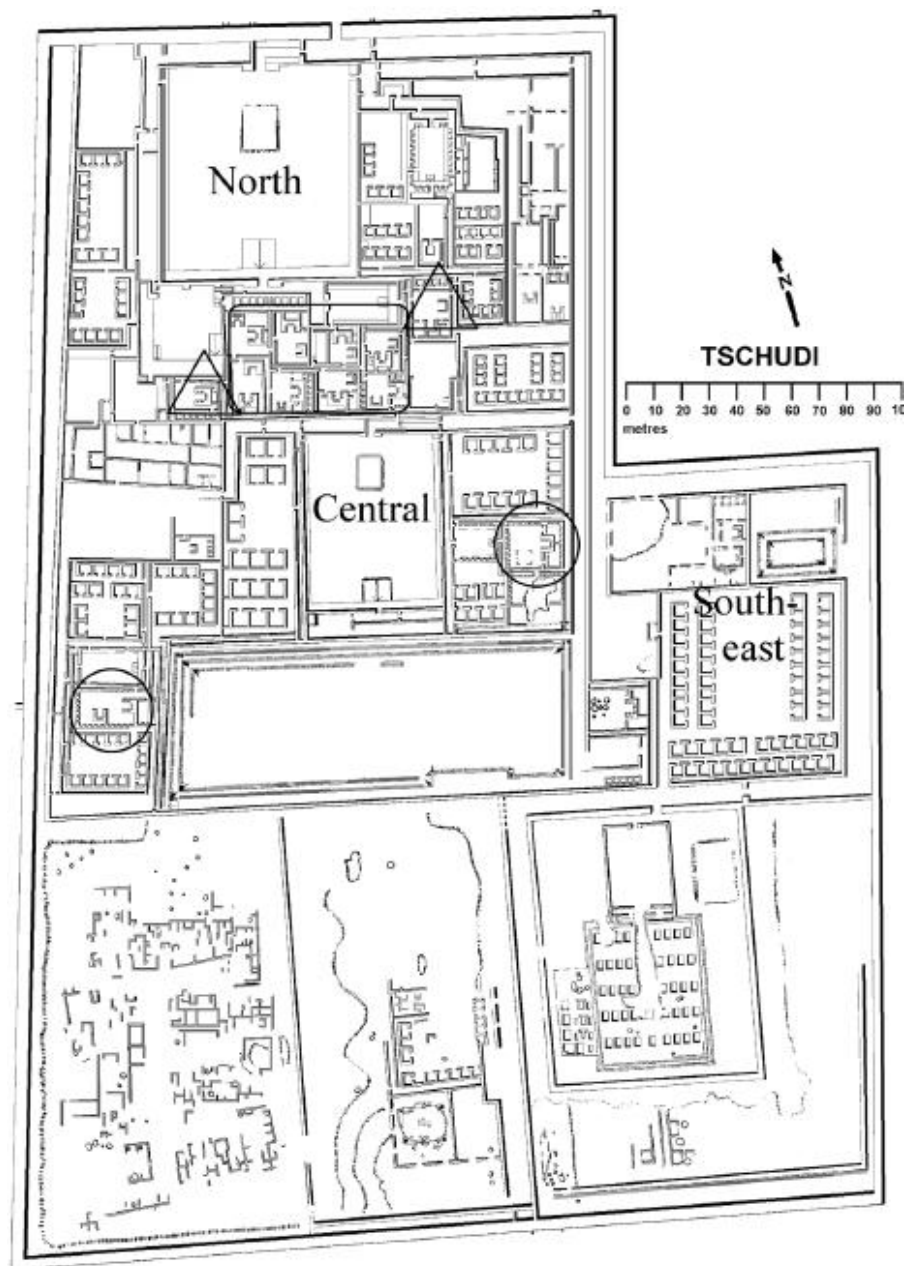


Figure 6.6 The Tschudi palace. The large rectangle encloses the cubicles. The triangles indicate the gatekeepers. The circles indicate the CEOs. From Topic (2003).

So the location of the U-shaped structures vis-a-vis the storage rooms provides us with information about the changing protocols: from the direct responsibility of one U-shaped structure for the specific recording of information about a particular storage court or group of courts, to the hierarchical organization of records about *all storerooms* that are shared or compartmentalized among a group of U-shaped structures.

The Distribution of Inka Storerooms

I return to the discussion of Chimú storerooms below, but first I want to briefly discuss a few cases of Inka storeroom distribution. Inka storage is justifiably famous (for an early classic study, see Morris 1967), and its scale is far beyond the scale of storage present at Chan Chan, in terms of both storage capacity and regional distribution. While the Inka *quipu* recorded many different types of information, one of those types of information concerned the materials in the storerooms (see [Figure 6.1](#)). Indeed, several scholars have considered the storerooms themselves to have been an integral part of the accounting system (D’Altroy and Earle 1992; D’Altroy and Earle 1992; LeVine 1992a; Morris 1967, 1992b, 1992c; Topic and Chiswell 1992).

Earle (1992: 339–340) summarizes this view of Inka storage structures as “units of accounting,” citing two main observations: first, that the storage units have a consistent size and, second, that the storage units are arranged in sites or in rows in which only circular or rectangular buildings occur. While neither of these points is entirely accurate, they do provide a place to start to examine storage as an accounting device.

When we think of Inka storage, the picture that most frequently comes to mind is probably Huánuco Pampa, with its array of storerooms in rows stretching along a hillslope overlooking the site. A standard interpretation is that the hillslope was probably chosen to catch the breezes, the colder air at night and the drying rays of the sun during the day (LeVine 1992b: 3–5). Moreover, the storerooms were designed and built with special features that would facilitate the active manipulation of temperature, humidity, and air circulation (Morris 1992c). In total there are 497 storerooms and twenty-five nonstorage structures arranged in eleven rows going up the hillslope (Morris 1992b). There are both round and rectangular structures; the round structures (278) predominate and vary in diameter from 2.0 to 6.3 meters. Morris (1992b: 157) notes that there are four modal diameters: 2.7, 3.3, 4.3, and 5 meters; similarly, the rectangular rooms varied in width from 2.5 to 3.4 meters and in length from 3 to 10

meters (Morris 1992c: 237). The first two rows are a mixture of round and rectangular storerooms; rows 3–7 have only round storerooms and rows 8–11, on the upper slope, have only rectangular storerooms.

On the basis of his excavations, Morris proposed that the circular structures usually were devoted to maize storage and the rectangular structures were usually devoted to tuber storage (Morris 1992b, 1992c). Morris (1967) felt that the differently shaped storerooms would help with accounting for the goods within the storerooms. However, there was at least one case where maize and potatoes were stored in the same circular room (Morris 1992b: 162; 1992c: 246). This case is in row 2, where there were two small circular storerooms flanking a rectangular room; Morris (1992b: 162; 1992c: 246) interpreted these rooms as storage for a small religious shrine. He also (Morris 1992b: 160–161) hypothesized that the mixture of room shapes in rows 1 and 2 might be related to short-term storage and that prestorage processing and packing may have taken place in this area. He (1992c) notes that maize was stored as kernels in large jars, while potatoes were stored wrapped in bales of straw.

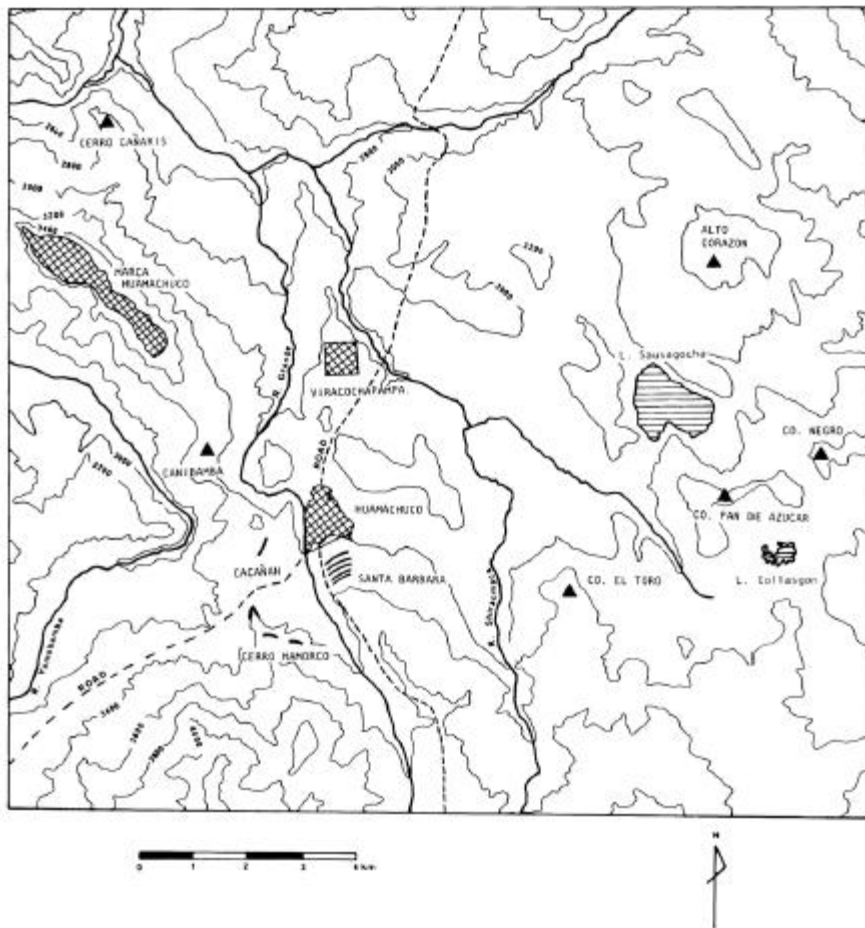


Figure 6.7 The location of storerooms around Huamachuco and some other important sites. The triangles indicate Inka period sites. From Topic and Chiswell (1992).

While Huánuco is an “artificial” city, built high on the cold grasslands thirty-eight hundred meters above sea level, Huamachuco was an Inka administrative center built in a well-populated and fertile area just below thirty-two hundred meters in elevation. Morris (1992c: 238) has noted that Inka storerooms were always in groups and aligned in orderly rows. In Huamachuco, the storerooms are arranged in five separate groups on three different hillslopes surrounding the center (Topic and Chiswell 1992) (Figure 6.7). All the storerooms are rectangular, but the different flooring, drainage, and ventilation features indicate a range of functions. While each group tends to have rooms similar in size, there are differences in size not only between the groups but also within the groups (Topic and Chiswell 1992).

Our excavations identified three types of storerooms. One type of storeroom is built on piers in order to allow ventilation below the

floor (Figure 6.8A); macro-botanical remains indicate that these were used for maize and probably other items demanding very dry conditions. Another type of storeroom had canals embedded into the floor, which would be useful both for drainage and for introducing higher humidity into the room (Topic and Chiswell 1992) (Figure 6.8 this volume). Morris (1992c: 251–257) has noted similar canals at Huánuco Pampa and suggested that the introduction of water into the subfloor would be useful for tuber storage by facilitating cooling and increasing humidity. Phytolith evidence indicated that two of the four excavated storerooms with canals had contained large quantities of *Stipa ichu*, a grass that may have been used as packing for bales of potatoes. One excavated storeroom was not elevated nor did it have canals, so it may have been more of a multipurpose structure. In this storeroom we found fragments of burned plaster, suggesting wattle and daub compartments within the structure, *Stipa ichu* phytoliths, and some carbonized maize. So, although all the storerooms in Huamachuco are rectangular, we have evidence there for specialized maize storage, specialized tuber storage, and for storage of a mixture of items in a single storeroom, just as Morris found for Huánuco.

Much as at Huánuco Pampa, there is a pattern to the grouping of storerooms. On one hill, Cerro Santa Bárbara, we estimate that there were about 125 storerooms for maize. These are located just above some agricultural terraces and we (Topic and Chiswell 1992: 231) consider the terraces, and storage complex to be related to production for the state, the religious institutions, or the Inka elite. Sherds of large storage jars are absent, so that the maize was probably stored in sacks rather than in jars.

The estimated twenty-six storerooms on Cerro Cacañán are associated with eight larger buildings that may have been used for administrative purposes, including prestorage sorting, measuring, and packaging (Topic and Chiswell 1992: 211, 221). The two excavated storerooms in this group both had sub-floor canals and were probably used for tuber storage. We excavated one of the nearby larger buildings (Figure 6.8b), which had two binlike rooms in one corner, which might have been used for measuring goods before they were packaged and put into storage (Topic and Chiswell 1992: 221). The association of administrative facilities with tuber storage suggests that this complex was the complement to the complex on Cerro Santa Bárbara and that it was also closely associated with state or elite functions.

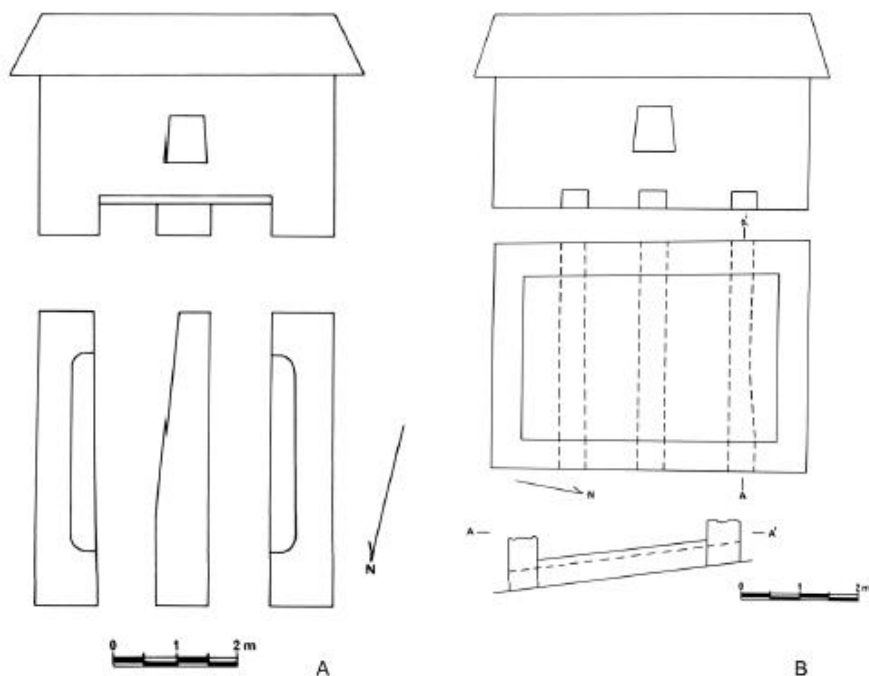


Figure 6.8 (a) Storeroom built on piers, allowing for the circulation of air below the floor. Cerro Santa Bárbara, Huamachuco. From Topic and Chiswell (1992). (b) Storeroom with canals in the floor in order to control humidity. Cerro Cacañán, Huamachuco. From Topic and Chiswell (1992).

On Cerro Mamorco there were three separate groupings of storerooms. These are made up (from the south) of a row of nineteen rooms, then a row of fifteen rooms, and then a V-shaped row of up to thirty rooms. We excavated three of the rooms in this last group. Two of the excavated rooms had canals and *Stipa ichu* phytoliths, suggesting tuber storage, and the third was the room with evidence for mixed storage. The evidence for mixed storage here, as well as the fact that the complex was divided into three distinct groupings, suggests that these storerooms may have been devoted to some special purpose or group, such as the local community, a shrine, or other institution (Topic and Chiswell 1992: 231).

In Huamachuco, then, we see the groupings of storerooms to be more significant than size or shape. However, the details of storeroom architecture certainly do suggest what might have been stored in each building. Returning to the theme of accounting devices, the architecture of the storerooms may have determined what commodity was best stored in each place; the location of the place, in terms of the five clusters, may have been related to the source and/or destination of the goods stored. Again, position, place, or location seems to be

part of the accounting system. The units of accounting may be listed in descending spatial order as the hillslope, the group, the storeroom (in some cases on Cerro Mamorco), the compartment, and then either the sack or bale.

When we turn to the Jauja area, the distribution of storerooms still clusters in groups, but those groups are much more dispersed around the major centers than in Huamachuco. There seem to be more than three thousand storerooms distributed across fifty-three sites in the general area of Jauja (D'Altroy and Earle 1992: 184; D'Altroy and Earle 1992: 262), but only 1,992, in thirty different sites, were located within the survey area of the Upper Mantaro Archaeological Research Project (D'Altroy and Earle 1992: 184). These sites were located as far as seventeen kilometers from the center at Hatun Xauxa. As at Huánuco Pampa, there were both circular and rectangular storerooms. However, based on a very small sample (six) of excavated structures, D'Altroy and Hastorf (1992) show that the botanical remains do not conform to Morris's suggestion that circular structures were primarily for maize storage while rectangular structures were for tuber storage.

While they have recognized that the storerooms vary in size (D'Altroy and Earle 1992: 184–189; D'Altroy and Earle 1992: 262) the Upper Man-taro project emphasized the standardized size of the structures as one of the principal accounting features (D'Altroy and Earle 1992: 201; D'Altroy and Earle 1992: 262; Earle 1992: 339), and, thus, they tended to measure storage in estimated volumes rather than in storeroom units (D'Altroy and Earle 1992: 184ff., [table 6.3](#)). They note that coefficients of variation for length and width of storerooms within each site were between 5 percent and 10 percent (D'Altroy and Earle 1992: 199–201), although variation between sites might be larger.

They viewed the shape of storerooms as reflecting state policy rather than goods stored. They note that the predominance of rectangular storerooms on the eastern side of the valley (303 of 417) correlates with a lack of population in a very fertile area; they interpret this as an indication that there were state-controlled farms in this area and that the produce was stored predominantly in rectangular storehouses and used to support direct state activities (D'Altroy and Earle 1992: 199ff.). In contrast, the predominance of circular storerooms on the western side of the valley (281 of 407) is associated with local population centers (D'Altroy and Earle 1992: 199ff.) and hence the financing of state activities within the local communities. The largest storage complexes adjacent to the main administrative center had a similar mixture of circular and rectangular units, such that site J-17 had a predominance of circular structures

(415 of 479), while the combined sites of J-15 and J-16 had a predominance of rectangular structures (305 of 452) (D'Altroy and Earle 1992: 193–194). Still, the data show only the predominance of one shape over the other, not absolute segregation into singular types. As Earle (1992: 340) notes, the meaning of these patterns is somewhat elusive.

I would emphasize the overall distribution of storerooms more than the shape or the size of the rooms. The location and grouping of storerooms into clusters, and the dispersal of the clusters of storerooms throughout the Jauja area carry information. In contrast to Jauja, the storerooms at Huamachuco and Huánuco were all located on hillslopes overlooking the administrative center. As in Huamachuco, and in contrast to Huánuco, the Upper Mantaro valley was well populated before the arrival of the Inkas so that the division of storage into multiple sites, the association of some storage sites with residential sites of the local population in the western part of the valley, and the provision of mixed types of storage might be similar to what we observed on Cerro Mamorco. What we gloss as “Inka storage” is better understood, in these cases, as a complex system serving community, ritual, and state needs (see Rothman, [Chapter 1](#), this volume).

Finally, there is the interesting case of Cotapachi, Bolivia. Geraldine Byrne de Caballero has published brief newspaper articles about this important site (Byrne de Caballero 1973, 1975; see also Snead 1992). According to her description, which may be idealized, the site consists of two groups of twelve hundred storerooms arranged in just two clusters. The storerooms in each cluster are perfectly aligned in a grid. All the storerooms are round and three meters in diameter. Only the foundations are present, but these are of cut stone; the superstructure must have been of adobe, probably with a conical thatched roof.

Even if the description is idealized, here there clearly is a concentration of structures of a singular form and consistent size. Many scholars associate the storage complex at Cotapachi with the state maize fields in Cochabamba (e.g., Morris 1992a: xii; Snead 1992: 76–77, 92). The Inka emperor Huayna Capac had established these very large fields and organized their production for the support of his armies (Wachtel 1982). Indeed, this is the best documented agricultural complex that was devoted to production for the state, rather than to production for individual members of the elite.

Cotapachi, then, may have been a storage center for maize from the state farm in Cochabamba before it was trans-shipped to other destinations, such as Cuzco. Notably, the number of storerooms in Jauja and in Cotapachi is on the same order of magnitude, but the

distribution is very different. Again, the implication is that there is specific information embedded in the distinct distributions. Whatever the dispersed pattern of storerooms in Jauja might represent, the Cotapachi storerooms are clearly structured in a much more formal and concentrated pattern. One possibility is that Cotapachi might reflect moiety structure at the state level.

These four cases suggest that the arrangement of storerooms in groups was at least as important to the Inka as the size or shape of the storerooms themselves.

Storage at Chan Chan

At Chan Chan, the shape of storerooms is relatively consistent in the sense that all are square or rectangular in shape. Storerooms are grouped into storage courts and within a court storerooms are often similar in size. The storerooms themselves are built of adobe bricks and have raised thresholds, probably to help keep out rats and mice (Day 1982a, 1982b). Other than the raised thresholds, the storerooms lack the sophisticated temperature and humidity control features of their Inka counterparts.

Since all the storerooms were systematically cleaned out at the time the site was abandoned, we have little evidence for what might have been stored in them or how the materials stored had been packaged. Textile impressions on the floors of some rooms (Day, personal communication) may indicate that either textiles were stored or that other goods were stored in cloth bags. In previous articles I have argued that a major function of the storage at Chan Chan was to provision thousands of artisans, primarily metalworkers and weavers, who lived within the city, as well as to collect and redistribute their products (Topic 1990, 2003, 2009).

In terms of exploring the distribution of storerooms as part of the accounting system, I am here interested especially in how the storerooms are distributed within the palaces. I have looked at a sample of the numbers of storerooms in the storage courts at Chan Chan ([Figure 6.9](#); see also the Appendix 6.1). Because some palaces are poorly preserved, I have drawn this sample of storage courts from the same palaces that I used in my previous article (Topic 2003). The numbers of storerooms per storage court are based on the Chan Chan maps (Moseley and Mackey 1974); those maps were drawn, in the first instance, on the basis of air photographs, followed up with field checking and some test excavations (Moseley and Mackey 1974). The sample consists of 2,025 storerooms arranged in 156 storage courts.

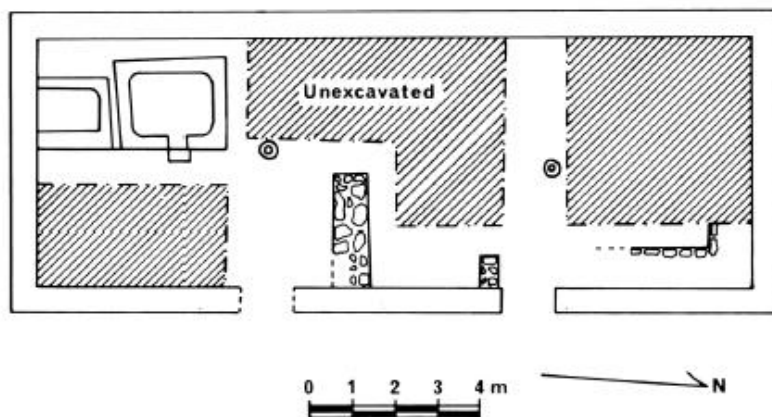
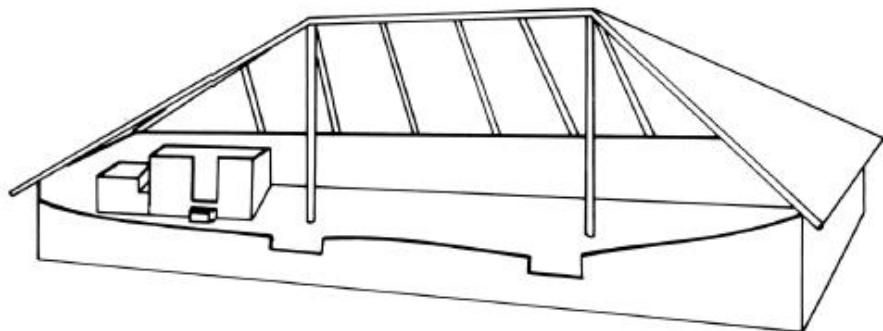


Figure 6.9 One of eight large buildings on Cerro Cacañán that may have been used for sorting and packaging material prior to storage. From Topic and Chiswell (1992).

The fact that the storerooms are arranged in clusters in storage courts probably does indicate that the clustering is part of the accounting system. From that point of view, it is of interest that 60 percent of the storage courts in this sample have twelve or fewer storerooms in them and 90 percent of the courts have twenty-four or fewer storerooms in them. On the other side of the equation, 74 percent of all storerooms occur in courts containing twenty-four or fewer storerooms. Yet there is a long tail to this distribution, so that we do have one example of a storage court with fifty-nine storerooms (see [Figure 6.10](#)).

These distributions are more like Huamachuco or Jauja than Huánuco or Cotapachi. The variation in the numbers of storerooms in different courts suggests, perhaps, either that different commodities were stored in different quantities (lots of beans, less cloth, for example), or that individual storage courts were dedicated to particular institutions or social groups, or that there was some other organizational scheme behind the particular clusters of storerooms.

There is clearly organization behind the pattern of storage, but, much as in the case of the *quipu*, while we can recognize the organization, we cannot name the qualifier that would allow us to understand the information content embedded in the organization. We can, however, explore the organization.

As mentioned above, the Inka used a decimal system for keeping accounts on the *quipu*; however, it doesn't seem (except in the case of Cotapachi) that they arranged their storerooms consistently in groups of ten. In the case of Chan Chan, it is certainly clear that the storerooms are not clustered in simple multiples of ten. However, they do seem to be arranged in multiples of two, three, four, and five (see [Figure 6.10](#)). Two times five, of course, produces the multiple of ten that we do see in the distribution as a peak just as two times three times three produces the more minor peak at eighteen.

Donnan (2009) has demonstrated that the Moche, who were predecessors of the Chimú, tended to emphasize the numbers five, ten, twenty, and forty. In our data, multiples of five occur, though the most common clusters of storerooms are four and eight (fifteen examples each). Donnan cites Sue Bergh's (1999) study of Middle Horizon (ca. AD 600–1000) tapestry tunics that showed common multiples of two, four, eight, and so on, along with a secondary pattern of multiples of five.

Urton (1997: 221ff.) has interesting observations about number concepts in Quechua, many of which relate to concepts of place: zero is viewed as empty or vacant; one is alone; two is one with its complement; three is an important number when counting by dozens and is also in the center of a group of five; five is in the middle of ten; and so forth. Interestingly, the number 7 has the negative connotation of bad luck, and conspicuously there is no storage court with seven storerooms.

Since the palaces were built and then occupied sequentially over a number of centuries, it is useful to consider their chronological relationships in any analysis. I use the sequence of palaces developed by Topic and Moseley (1985). Because of issues of preservation, not all palaces mentioned in that sequence will be included; instead, I include, in the first instance, only the same sample that I used in my earlier analysis of the U-shaped structures and just discussed in terms of the distribution of storerooms in storage courts (Topic 2003) (see [Table 6.1](#)). Then, as a means of testing the conclusions, I add in observations from two partially destroyed palaces (Gran Chimú and Velarde; see [Table 6.1](#)).

As [Figure 6.10a-c](#) illustrates, there are shifts in the distribution of

storerooms within storage courts through time. In the Early phase, the sample consists of 447 storerooms in thirty-two courts. The distribution of rooms within the courts ([Figure 6.10a](#)) is almost bimodal. However, most courts have relatively few storerooms in them (97 percent of the courts have twenty-four or fewer storerooms in them). During the Middle phase there are many more storerooms and storage courts: 932 storerooms distributed in sixty-four courts. The distribution is now skewed toward courts with smaller numbers of storerooms. However, there are several courts with larger numbers of storerooms, such that only 80 percent of courts have twenty-four or fewer rooms. During the Late phase, there are 646 storerooms located in sixty courts. The distribution is more skewed to smaller numbers of storerooms per court, but with a long tail. Only two storage courts have more than twenty-four storerooms in them, and these account for the long tail.

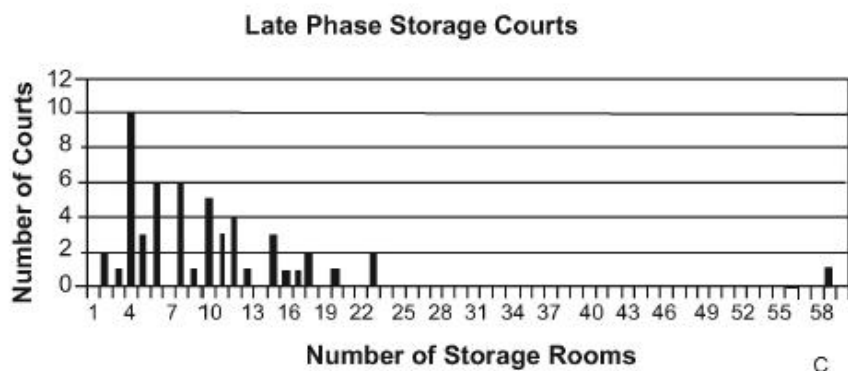
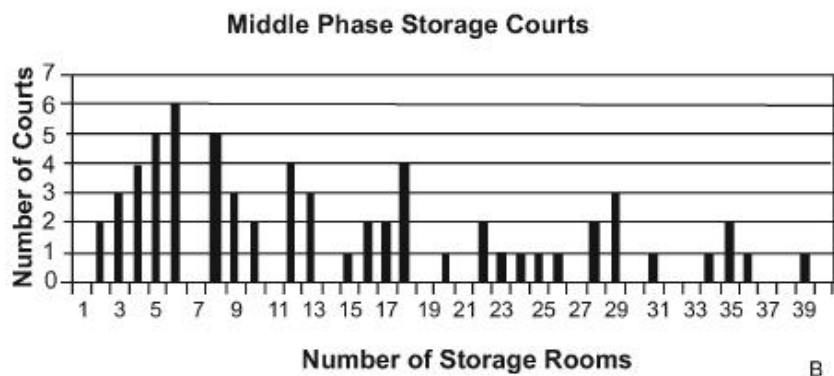
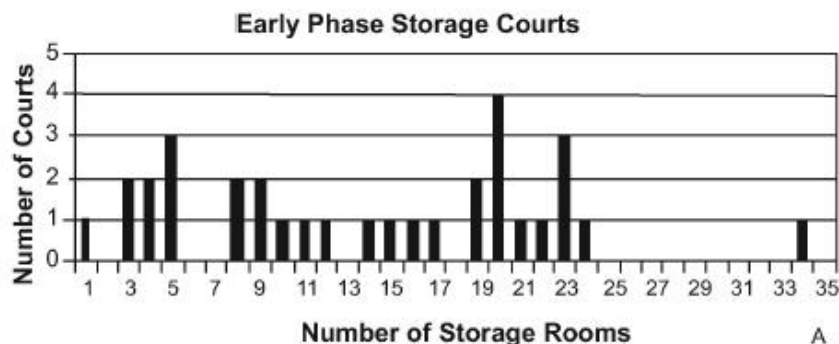


Figure 6.10 The number of storerooms per storage court in a sample from Chan Chan (a) Early Phase, (b) Middle Phase, (c) Late Phase palaces.

Table 6.1

A Sequence of the Palace Units Used in This Study

Period	Palace or palace sector ^b	Approximate date AD
	Tschudi	1470
LATE	Rivero	
	Bandelier	
	(Velarde) ^a	

	(Gran Chimú) ^a	1350
	Laberinto (North) ^b	
MIDDLE	Uhle (Northwest) ^b	
	Tello (Northeast) ^b	
	Laberinto (Central) ^b	
	Uhle (Southwest) ^b	1150
	Tello (North) ^b	
EARLY	Uhle (Northeast) ^b	
	Tello (South) ^b	900

Note: a. Due to preservation problems, Velarde and Gran Chimú are not included in the initial analysis, but are brought in as test cases later in the analysis.

b. During the Early and Middle Period, only sectors of palaces seem to have been occupied sequentially.

Table 6.2 illustrates these data in a slightly different format. The table shows the percentage of storerooms that are located in courts with twelve or fewer rooms and twenty-four or fewer rooms, by phase. The clearest trend is the increase over time in the percentage of courts with twelve or fewer rooms; the percentage of courts that have fewer than twelve rooms shifts from 47 percent in the Early phase to 75 percent in the Late phase. This suggests that the units of storage and, by extension, the accounting units are becoming smaller or more focused or more precise through time. While, again, it is impossible to say exactly what this means, it suggests that accounting units are being parsed into more specific categories. This parsing would, in turn, facilitate more precise accounting.

Table 6.2

Distribution of Storerooms in Storage Courts by Phase

Phase	Number of courts	Number of rooms	≤ 12 Rooms/ court	≤ 24 Rooms/ court
Early	32	447	47%	97%
Middle	64	932	53%	80%
(Gran Chimú)	12	283	33%	58%
(Velarde)	17	301	59%	76%
Late	60	646	75%	97%

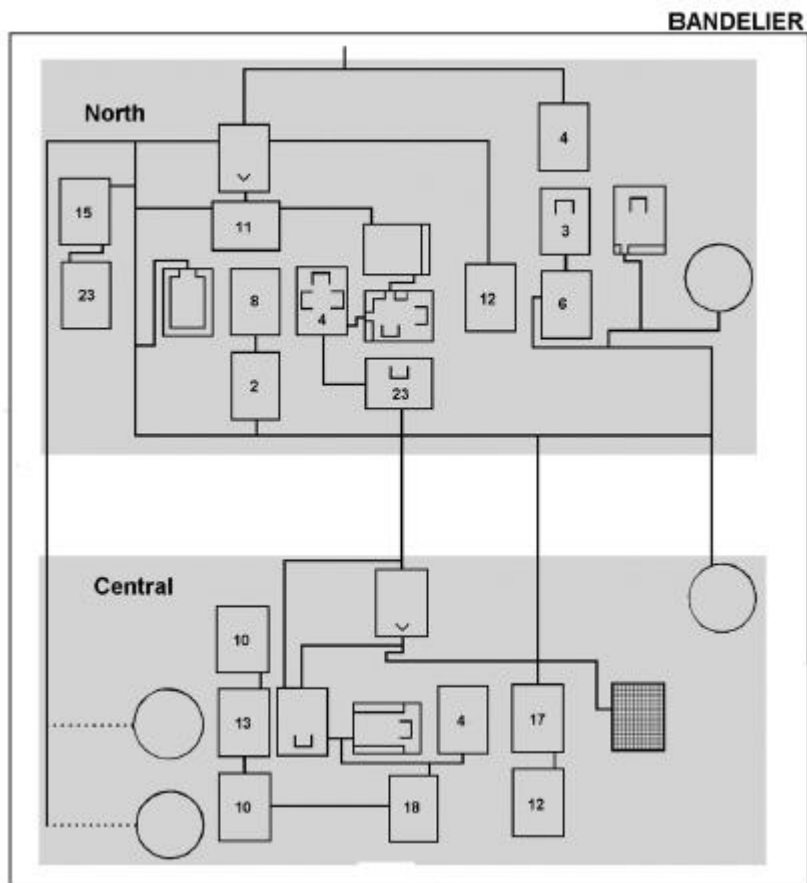


Figure 6.11 A diagram of the Bandelier palace. The circles are wells; the rectangles are courts. The rectangles with numbers are the storage courts with the number of storerooms indicated. The block U-shaped buildings are the *audiencias*. From Topic (2003).

For comparative purposes, I have included information on two more poorly preserved palaces, Gran Chimú and Velarde. Gran Chimú dates to the end of the Middle phase, while Velarde dates to the beginning of the Late phase. While the information for these two palaces is not as complete as for the rest of the sample, they are not inconsistent with the pattern observed.

As already mentioned, early storerooms are often located near the U-shaped structures, while the late storerooms are often isolated from the U-shaped structures. This pattern is also related to another pattern: the late palaces are divided into a northern and a central sector (Figure 6.6; see also Figures 6.11–6.13). In the last four palaces (Table 6.1) there are always proportionately more U-shaped structures and fewer storerooms in the northern sector and proportionately fewer U-shaped structures and more storerooms in the central sector

(Moseley 1975a). This has been interpreted to reflect the differential flow of goods into and out of the palaces, with longer-term storage in the central sector and a higher turnover of goods in the northern sector (i.e., Topic 2003); the higher turnover would require more accountancy and hence the larger number of U-shaped structures.

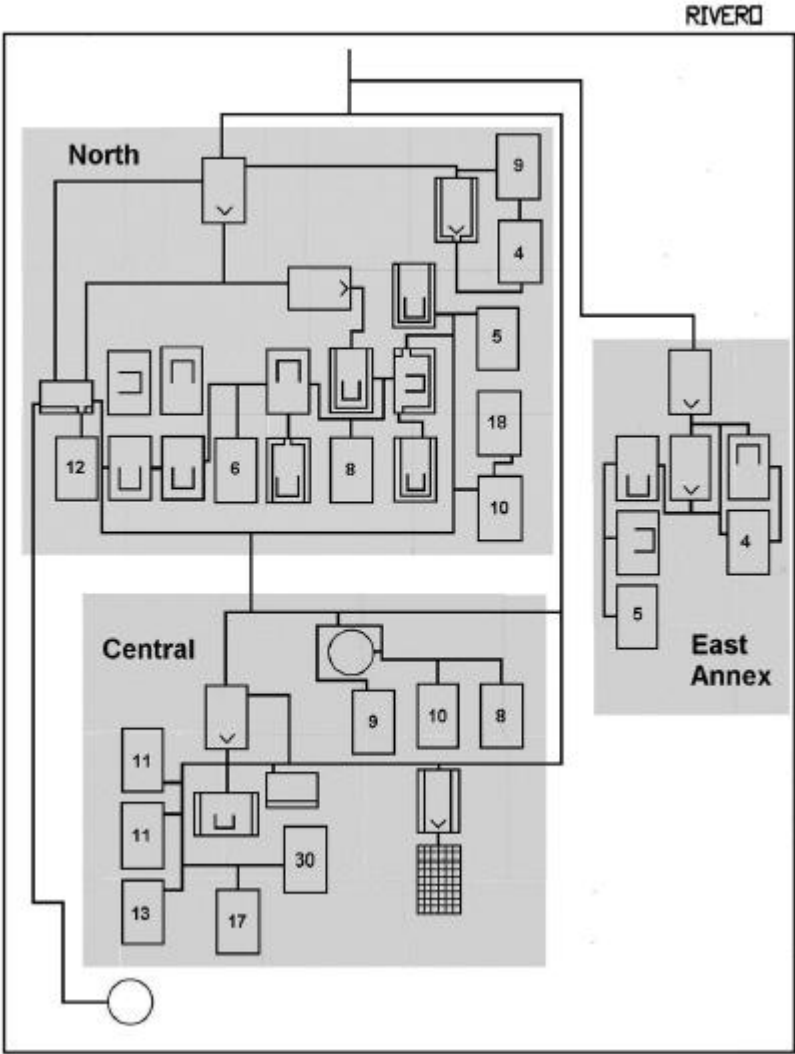


Figure 6.12 Diagram of the Rivero palace. From Topic (2003).

Table 6.3

Storage in the Last Three Palaces by Sector

Palace	North	Central	East	South
Bandelier				
Courts	11	7	---	---
Rooms	111	84	---	---

Average # of rooms/court	10	12	---	---
Courts with fewer than twelve rooms	73%	57%	---	---
Bandelier				
Courts	8	8	2	---
Rooms	72	109	9	---
Average # of rooms/court	9	13.6	4.5	---
Courts with fewer than twelve rooms	88%	62%	100%	---
Bandelier				
Courts	13	7	3	1
Rooms	104	80	69	8
Average # of rooms/court	8	11.4	23	8
Courts with fewer than twelve rooms	92%	57%	67%	100%

Figures 6.11–6.13 illustrate the last three well-preserved palaces in diagrammatic format. Bandelier is divided into two clear sectors; Rivero has a northern and central sector as well as a well-defined eastern sector; Tschudi seems to have a northern, central, and eastern sector, plus an isolated storage court in the south. Table 6.3 summarizes some information about the courts and the storerooms. In the north sectors, where there would be a higher turnover of goods, we see a higher percentage of courtyards with twelve or fewer storerooms than we find in the central sectors. The average number of storerooms per court is also consistently slightly smaller in the north sectors than in the central sectors. The eastern sectors and the one southern sector are idiosyncratic. In general, though, the comparison between the northern and central sectors seems to reinforce the interpretation that smaller units of storage were employed as accounting systems became more sophisticated at Chan Chan.

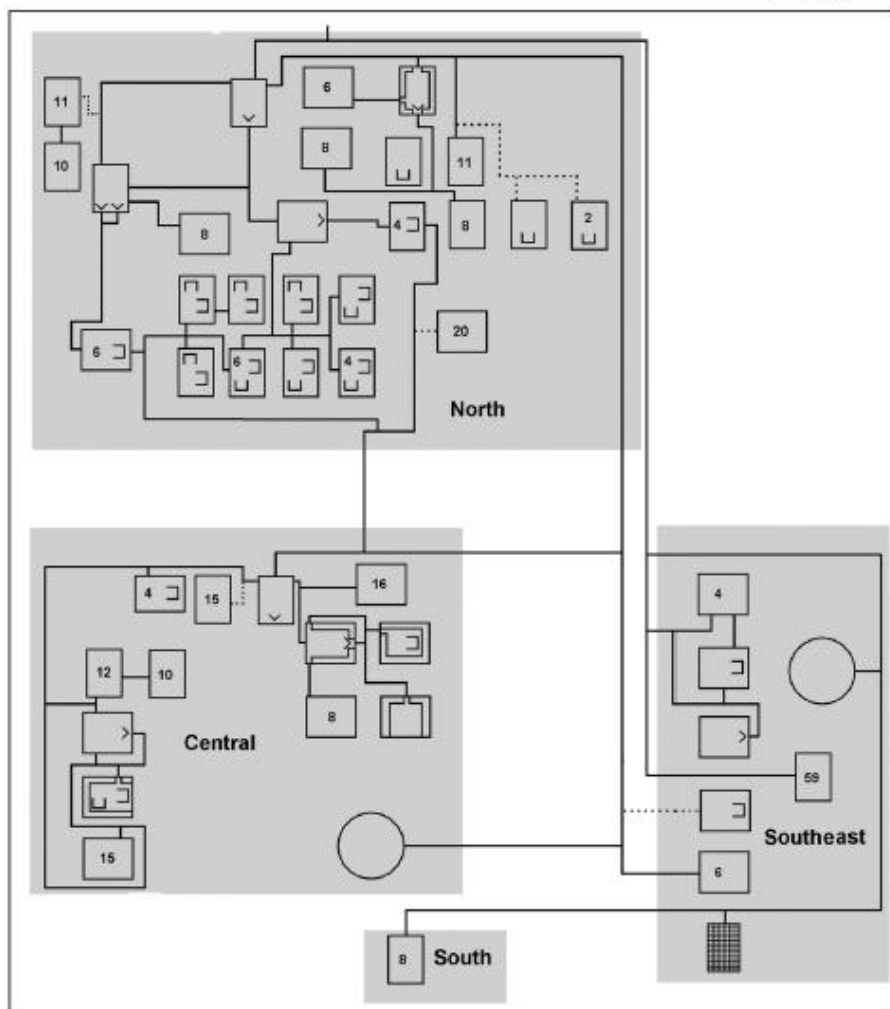


Figure 6.13 Diagram of the Tschudi palace. From Topic (2003).

Conclusion

Andean accounting systems use tokens put into places that represent the categories of things being counted. Here I have explored that dimension of place, positioning, or location as it pertains to a number of distinct situations, with a special focus on how the arrangement of storerooms may contribute to the keeping of records.

Both Inka and Chimú storerooms tend to be relatively standardized in size, at least within particular complexes. However, I think that the packaging of the things stored, whether in bales, jars, or sacks may have been as important to the record keeping as the size of the storeroom itself. Both Morris (1992b) at Huánuco and Topic and

Chiswell (1992) at Huamachuco describe facilities that may have been used to sort, measure, and package materials before storage.

Storeroom shape was probably another “qualifier” that aided in keeping account of materials stored, but it may have been applied differently in different situations. For Huamachuco, for example, the ventilation and drainage features were more important than shape itself. The presence of just a single shape at Cotapachi and at Chan Chan (although these varied in dimensions) would not have helped to differentiate the contents of one room from another.

The distribution of storerooms was certainly another element in the record-keeping system. We have seen how at Cotapachi there were only two main groupings of buildings, at Huamachuco five, at Huánuco eleven rows, and in Jauja fifty-three distinct sites. These groupings must have meant something to the people charged with keeping track of the materials stored, but as with some of the qualifiers applied to *quipu*, we may never know what information was being conveyed.

The same applies to the groupings of storerooms within storage courts at Chan Chan. There, however, the limited amount of patterning that was discussed in this chapter does seem to correlate with the development of bureaucracy at the site (Topic 2003), as well as with some Andean numerical concepts.

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INKA STORAGE SYSTEMS IN THE IMPERIAL HEARTLAND (CUZCO, PERU): RISK MANAGEMENT, ECONOMIC GROWTH, AND POLITICAL ECONOMY

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Introduction

Risk pervades all forms of human subsistence, and families, kin groups, and civil societies pursue strategies at different social scales to avoid disruptions to their food supplies (e.g., Halstead and O'Shea 1989). Surplus production represents one strategy to mitigate risks of food insecurity, and it is not always compatible with other risk-reduction strategies (see Winterhalder, Lu, and Tucker 1999). Surplus can consist of extra food produced or collected and stored against predictable (and unanticipated) fluctuations in food supply, as well as other resources (e.g., domesticated animals, craft goods, money), and even labor obligations.

Ethnologists frequently downplay the role of surplus production in domestic economies—and across kin networks and communities—to emphasize principles of domestic satisficing and self-dampening social mechanisms (e.g., Sahlins 1972; cf. Dow 1981). Food-producing households labor to meet anticipated needs, and those that amplify production tend to do so only for a short time before dispersing accumulated surpluses (Rappaport 1968). Whether or not competitive feasting cycles and reciprocity-oriented gif networks keep surpluses from accumulating in a single household, they increase the likelihood that someone is always generating surplus. The quest for prestige can create temporary food patches that benefit people across a community or region, while exchange, gift, and marriage relationships cast a web of social obligations that can mitigate local food insecurity.

Surplus is typically associated more intimately with social power in complex societies, and particularly in states. Urban populations require steady surpluses produced primarily in rural contexts, which can be organized, assembled, and redistributed by public or private entities. Although state institutions figure prominently in discussions of surplus production and storage, noble individuals or families hold

disproportionate economic power that can rival or approximate a political economy under certain circumstances (see Manzanilla on neighborhood centers, this volume). Nobles and representatives of state institutions might coerce subjects to give taxes, tribute, or labor for their risk-management strategies, but they might also attract voluntary investment for these. As they provide pools of labor for maintaining elite and state projects, peasant households also work to manage the risks that they perceive in their own domestic economies (see Hirth 1996). From a risk-management perspective, peasant economies buffer against more proximate and predictable risks, whereas noble and political economies claiming to protect society against large-scale catastrophes direct uneven flows of goods and labor. Ancient states should not be conceptualized as insurance corporations; participation was obligatory, ‘premiums’ could not be banked indefinitely, and the state did not always acknowledge a social debt toward its subjects, even when able to do so.

State risk-management strategies unfold within a broader sociopolitical context, and scholars should consider the impact of reallocating lands, goods, and labor from local networks; the dynamics of surplus growth and resource preservation that state strategies prescribed; and practices of surplus redistribution in good and bad times. This chapter discusses elite-directed storage in the Inka Empire (ca. 1400–1530s), the largest indigenous state to develop in the Americas (Figure 7.1). After discussing colonial Quechua vocabulary for risk, food insecurity, and storage, we review ethnohistoric descriptions of Inka storage systems in provincial regions and the area surrounding Cuzco, the imperial capital. Finally, we present an overview of architectural and archaeological evidence for Inka storehouses in the Cuzco region and implications for reconstructing Inka noble and political economies.

Andean Conceptualizations of Risk and Uncertainty

Early Quechua dictionaries reveal Andean views regarding risk and food insecurity in the generations following the Spanish conquest, although such sources are not direct windows into prehispanic conditions, and no lexicon captures the diversity of landscapes and social conditions. The 1560 dictionary of Domingo de Santo Tomás (1951 [1560]) includes entries for *necessity* and *lack*. For example, *pisiy* connotes a shortfall of what is needed or desired based on insufficient weight or measure—a failure owing to wastage, leakage, or some other loss. In contrast, *muchuy* is ‘not having what is needed,’ but also connotes the experience of punishment. In his early seventeenth-century lexicon, Diego González Holguín (1989 [1608]) links *muchuy*

to God's punishment of sin. Whereas *muchuy* communicates suffering as a consequence of one's iniquities, *wanay* has a related but positive meaning; it is associated with both necessity and with correcting one's ways and making amends, especially for sinful behavior. For Inka nobles, shortages might reflect a failure to fulfill imperial labor demands, but local farmers might describe shortfalls in the reciprocity-based language of their kin and labor networks, conceptualizing suffering in supernatural terms, as a consequence of insufficient reverence to local ancestors and sacred entities.



Figure 7.1 Map of Inka Empire.

Early dictionaries define resource shortages, and González Holguín's entry for 'sterile year' (*muchuy pacha* or *ch'aki y wata*) suggests difficult conditions across a region or for an extended period. Entries for *hunger* range in intensity from want of food (*varqay*) to death by starvation (*mihuymanta wañuy*). The dictionaries define the act of inflicting poverty on others (*waqchachiy*), as well as enrichment of oneself (*apu*

tukuy)—such distinctions suggest unequal distribution of resources that would be accentuated in times of food shortages. Poverty and lack of family are conceptually linked, suggesting that kin networks of risk management were considered distinct from mechanisms employed by nobles or state institutions to ensure that certain people were always fed. Inka interventions in local communities frequently disrupted social and economic networks to the point that royal intervention was needed, and it is noteworthy that the emperor and his wife both used the royal title *waqchakhuyaq* ('compassionate toward the poor') and reportedly provided for widows and orphans.

Storage terminology is common in the early Quechua dictionaries. Drought (*ch'akiy wata*) represents a period of risk and food uncertainty, but drying food in the air or sun (*masay*) to store in a safe place (*churay*) addresses seasonal and annual climate fluctuations. Several domestic features could hold stores, including elevated platforms for maize (*marka*), interior storage bins of various forms (*pirwa*, *urun*, *taq'e*, *ch'away*), and belowground pits for tubers (*qoto*) (e.g., Arriaga 1999 [1621]: chap. 2; Betanzos 1999 [1550s]: part I, chap. 17; Garcilaso de la Vega 1965 [1609]: bk. 5, chap. 5). Taking things out (*horqoy*) for distribution connotes social hierarchy, as in González Holguín's entry for 'to dispense' (*kamachisqamanta horqopuy*: 'to take out from that which is administered'). Santo Tomás lists a special structure for keeping stored goods (*churakuna wasi*), as well as a devoted social status specializing in dispensing stores (*churakuy kamayuq*). The seventeenth-century indigenous chronicle of Felipe Guaman Poma de Ayala (1980 [1615]) links this kind of storage with the royal palace, which contained structures for drying food (*masana wasi*), guarding stored things (*churana wasi*), and brewing maize beer (*aqha wasi*). Such buildings reflect the role of noble and state institutions in provisioning certain individuals and households, and are consistent with a noble Inka economy that is identifiable in parts of the region surrounding Cuzco, the imperial capital.



Figure 7.2 Felipe Guaman Poma de Ayala's representation of a *qollqa* complex, with a quipu specialist reviewing records with the Inka ruler.

A second type of storage facility typically linked to the Inka political economy is the *qollqa*, which Santo Tomás defines as a storehouse for grain, bread, or wine. A few chroniclers mention the *qollqa* in the context of surpluses collected for provincial administration (e.g., Guaman Poma de Ayala 1980 [1615]) (Figure 7.2), but most sources describe storehouses in Spanish without distinguishing whether they

were *qollqa* or another kind of structure.

Inka Expansion and Political Economy

Inka imperial conquests after AD 1400 annexed vast and diverse new territories characterized by different pre-Inka patterns of surplus production and distribution (Covey 2008). Few highland areas at that time show evidence of agricultural intensification or storage outside of households. Populations in intermontane valleys and high-elevation pasture areas often settled in areas offering defense and local access to diverse agro-pastoral resources. In contrast, many coastal areas were economically centralized and specialized, with ostentatious noble strata and well-developed state institutions funded by hydraulic agriculture and full-time fishing populations (e.g., Marcus 2008; Moore and Mackey 2008). Coastal states invested heavily in specialized craft traditions and monumental constructions that converted surpluses of food and labor into ideological statements supporting state institutions and the ruling elite.

Inka conquest of decentralized regions led (to varying degrees) to the establishment of an imperial political economy. The administrative reorganization of provincial populations extracted significant pools of labor for state projects that could reduce food insecurity risks. New irrigation canals and agricultural terraces created lands that were less susceptible to drought and frost, and crop selection and fertilizer amplified harvests on state lands. Storehouse construction supported the collection, movement, and redistribution of state surpluses. An improved road network expanded the regional scope of staple economies (D'Altroy 1992), and centrally organized camelid herding intensified high-elevation grazing, providing beasts of burden and fine fiber for craft production. Staple surpluses funded local administration, whereas the means of producing wealth goods shifted to the capital region, where they supported personal connections between the Inka ruler and the nobles and officials who staffed the imperial political hierarchy (D'Altroy and Earle 1985).

Archaeologically, the study of Inka provincial storage emphasizes *qollqa* structures distributed along the imperial highway and near highland administrative centers and state farms (e.g., LeVine 1992); coastal storage is harder to identify and to associate with Inka imperial policies (e.g., Snead 1992). Early chroniclers associate provincial storehouses with state infrastructure, identifying their role in transporting raw materials and staple goods to key locations in the imperial network (Betanzos 1999 [1550s]: part I, chap. 22; Cieza de León 1988 [ca. 1550]: chaps. 16, 18–20; cf. Diez de San Miguel 1964

[1567]; Ortiz de Zúñiga 1967 [1562], 1972 [1562]). Local officials stocked way stations with food and other necessities for state travelers (including soldiers), and Inka governors maintained large stores of maize, potatoes, and other staples at administrative centers. (Administrators sent raw materials for high-status craft production to Cuzco, where artisans crafted wealth goods that could be distributed as gifts from the Inka lord to faithful subjects.) Imperial officials used stored staple goods to feed laborers on state projects, and to fund periodic festivals that punctuated the provincial ritual calendar. When state functions in a given year did not exhaust these supplies, officials distributed them to ‘the poor’—widows, orphans, the disabled, and people without kin. Local communities also provided labor on special fields to support these individuals. Cieza de León (1988 [ca. 1550]) notes that provincial communities might receive food aid from state stores in bad times, as a loan that had to be repaid. Tributary laborers were fed while working on state projects, but they had no social right to the surpluses that their work generated.

Most provincial storehouses are groups of small circular or rectangular structures, the largest of which comprise hundreds or thousands of structures (e.g., Snead 1992). Some scholars associate round buildings with maize storage and rectangular ones with tubers, although documentary descriptions and excavation evidence indicate that a broader set of stores could be placed in either type of building (e.g., Betanzos 1999 [1550s]: part I, chap. 22; D’Altroy and Hastorf 1984). Storage architecture at provincial centers and other key sites worked in tandem with *quipu* (knotted string) records (Morris 1967), and it is likely that specific administrative units transported goods from a given source and placed them in a designated building (cf. Betanzos 1999 [1550s]: part I, chap. 12). Hillside complexes were visible on the landscape as a mnemonic for state record keepers.

Storage and the Noble and Political Economy of the Inka Heartland

Storage in the Inka imperial heartland differed from highland provinces in at least one respect: the capital received precious metals, shell, tropical bird feathers, and other raw materials that were worked into fine craft goods. Eyewitnesses describe Cuzco as a place where great wealth was on display, but it went out to the provinces only as gifts from the Inka ruler (Covey 2009). Some materials and products were kept in special facilities, including palaces, temple complexes, and the ‘fortress’ of Saqsaywaman (see Bauer 2004). Despite the emphasis on wealth storage in early chronicles, there is evidence that the production and storage of staple surpluses was of central importance to the development of the Inka heartland.

Regarding domestic storage, the early chronicler Juan de Betanzos offers a detailed account of how Inka state growth involved the development of new storage facilities. Betanzos (1999 [1550s]: part I, chap. 9) states that before the first Inka imperial conquests, local households maintained their own stores of food and cloth, storing maize in bins called *orones* (part I, chap. 17). As Inka dominion spread, Inka Yupanque (Pachacutic) issued decrees regulating storage and establishing Cuzco's political economy. The first of these required subject populations to produce surplus staple goods and transport them to Cuzco. Over a five-year period, Inka Yupanque ordered the construction of storehouses (*depósitos*) on the hillsides surrounding Cuzco and designated them for the storage of dried and fresh maize, chili peppers, beans, dried potatoes, quinoa, dried meat, and other foodstuffs (Betanzos 1999 [1550s]: part I, chap. 12). These supplies fed workers involved in state construction projects, and the lords and citizens of Cuzco also received provisions to augment stores that they produced to support their own households and servants.

After securing the urban food supply, Inka Yupanque ordered new storehouses for textiles, both high status garments and rough *cabuya* cloth used in state work projects (Betanzos 1999 [1550s]: part I, chap. 13). Once the ruler controlled massive surpluses of staple and craft goods, he provisioned new households, although families were still expected to produce their own surpluses and store them at home. There were food distributions in Cuzco every four months and an annual textile distribution. If state-given stores were accidentally destroyed, they were replaced from the state storehouses so that misfortune would not leave anyone in need. This state-dictated insurance program reportedly broadened state storage categories to include all domestic goods—even *cabuya* shoes for llamas to wear. Inka Yupanque gave staple goods to the people of Cuzco, but he also confiscated wealth brought to the city privately, which went into state storehouses (Betanzos 1999 [1550s]: part I, chap. 21).

Early archival records mention storage complexes in Cuzco and in the countryside near royal estate lands (Rostworowski 1970: 83; Villanueva Urteaga 1971: 50). Rural storage facilities housed noble surpluses, which remained private resources that were distinct from surpluses used for state projects. Garcilaso de la Vega (1965 [1609]: bk. 5, chap. 5) remembers large storehouses in the Cuzco region with bins (*pirwa*) built in their interiors, which held surpluses of the nobility and the state religion. Stating that he had seen such constructions during his youth in Cuzco—in the former *aqllawasi* complex—this chronicler claims that these facilities collected food not only for ceremonial occasions but also for feeding people working for

the individual, lineage, or institution that owned a bin.

Archaeological Evidence for Storage in the Inka Imperial Heartland

Despite the recognition of the distinctive storage architecture of the Cuzco region (e.g., Morris 1967), contemporary scholarship tends to presume that an imperial political economy similar to that of the provinces also governed the capital. Cuzco-region storehouses share some architectural characteristics, but there are important differences in form and function that should be considered. Developing a regional perspective on storage and economy in rural Cuzco is a challenging archaeological task, owing to the variable architectural preservation across the region, the continued use of some buildings in the Colonial period, and problems with assuming a consistent linkage between form and function for surviving architecture. Acknowledging the limitations of the present evidence, we discuss storehouses found to the north and west of the Cuzco Valley, in areas systematically surveyed by the first author ([Figure 7.3](#)).

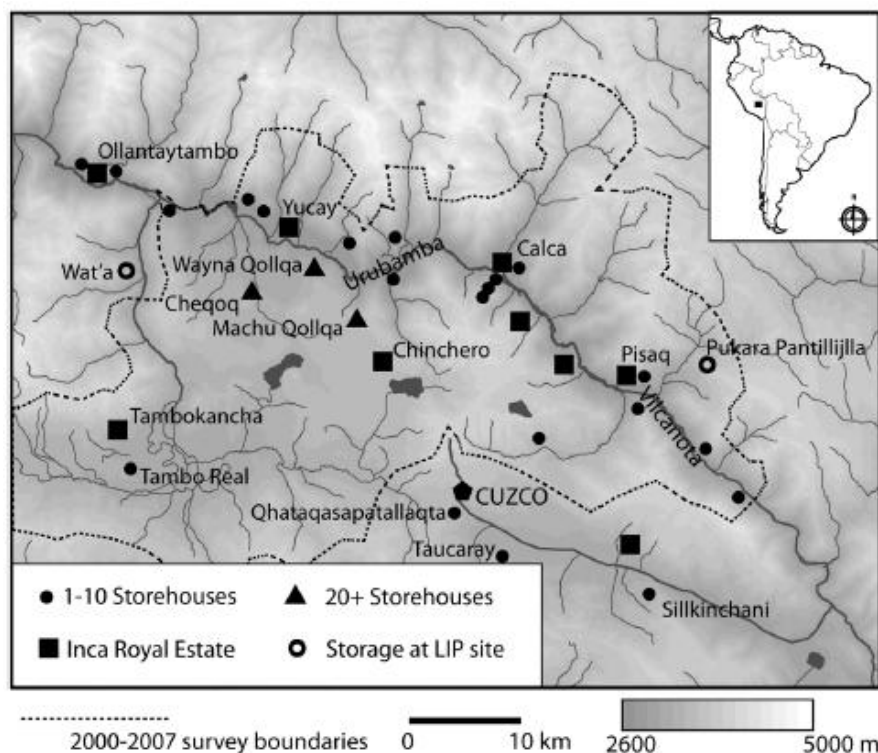


Figure 7.3 Map of Cuzco region showing surveys by the first author and the locations of royal estates and storage facilities. Not all known storehouses outside of the survey region are noted on the map.

Domestic Storage in the Imperial Period

There is limited excavation evidence for reconstructing domestic storage practices in imperial Cuzco. In the Cusichaca region, Kendall (1994: 44) interprets postholes in several domestic structures as indicating raised storage areas (*marka*) at the sites of Huillca Racay and Patallacta. Other excavators describe circular stone-paved platforms in possible Inka domestic structures south of Cuzco in Chumbivilcas, although their storage function remains debatable (Galiano Blanco 2010). This is a distinct practice from the semi-subterranean storage of tubers (*qoto*) in other higher-elevation areas (e.g., Kosiba 2010). Until more data are available from early and imperial Inka households, the consideration of storage must be limited to a top-down general analysis of specialized storage complexes preserved in some parts of the Cuzco region.

Architecture of Cuzco Inka Storage Complexes

Most surviving storage architecture is not directly associated with state installations or elite compounds, so it is likely that the majority of structures seen today in the Cuzco region held staple goods or lower-status craft items rather than exotic raw materials and wealth goods. This observation is significant because storage structures in the Cuzco region often have architectural plans that are distinct from the provincial *qollqa*. Jean-Pierre Protzen (1993) has formalized this distinction in his designation of two types of rectangular storage structure.

Type 1 Storehouses

Type 1 structures are analogous to rectangular provincial *qollqas*. They are either long structures subdivided into small chambers, or lines of closely spaced, single-chambered structures (Figure 7.4). Whereas the provincial *qollqa* rarely has more than two chambers, Type 1 storehouses in the Cuzco region have as many as five or six interior chambers. In cases where Type 1 complexes comprise multiple freestanding structures, individual chambers seem to be more closely placed and aligned into a more compact facility. Building areas for individual chambers are modest, with average dimensions of 1.8 by 1.6 meters (2.88 square meters) for those studied by Protzen. Huaycochea (1994) noted somewhat larger interiors in her study sample, although chamber size typically was less than ten square meters. Modest-size complexes of Type 1 storehouses are common around Ollantaytambo, but are not found in large numbers in other

parts of the Cuzco region.



Figure 7.4 Photograph of a Type 1 complex at Pusaqraqayniyuq in the Sacred Valley near Urubamba.

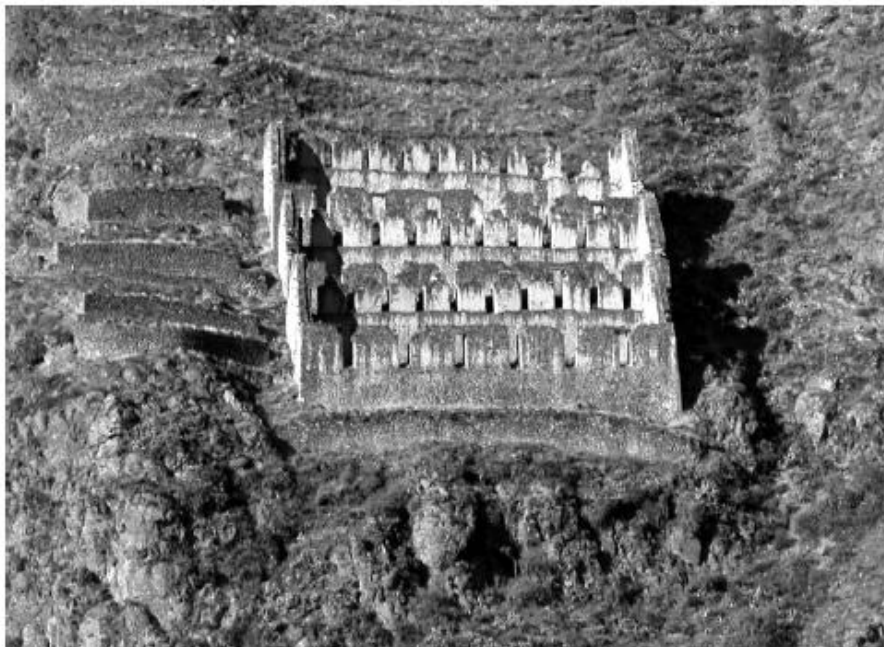


Figure 7.5 Photograph of a Type 2 storage compound located above Ollantaytambo.

Type 2 Storehouses

Whereas Type 1 storehouses are analogous (but not identical) to the square provincial *qollqa*, Protzen's Type 2 has no provincial counterpart (cf. Morris 1967). The Type 2 storehouses at Ollantaytambo are rectangular, with widths of about three meters and lengths ranging from ten to thirty-eight meters (interior areas of thirty to more than one hundred square meters) (Figure 7.5). The large range in building areas suggests great diversity in interior areas and overall storage capacity. Research elsewhere in the Cuzco region has identified well over one hundred additional Type 2 structures, primarily at sites in the Cuzco Valley and in or near the Sacred Valley. Surviving complexes in the Cuzco Valley have a modest number of structures arranged in evenly spaced rows that often share a central staircase. The architecture is consistent with smaller Type 2 structures from Ollantaytambo, with interior areas ranging from thirty to sixty square meters (Candía Gómez 1992; Huaycochea 1994; Pilco 2006; Rivera Dorado 1971; Rowe 1967). These facilities contrast with the large Sacred Valley area complexes at Cheqoq, Wayna Qollqa, and Machu Qollqa, which contain dozens of buildings, with multiple structure sizes found in distinct zones (Guevara 2003, 2004; Morris 1992; Niles 1999; Soto H. 2002; Valencia Sosa 2004). For example,

Machu Qollqa has seven storehouses in the sixty-square-meters range (roughly four by sixteen meters), but most structures at the large complexes have interior areas of more than one hundred square meters, with numerous storehouses larger than two hundred square meters. Estimated roofed areas at the largest facilities reach several thousand square meters—a vastly different scale from the complexes observed by Protzen (1993) and Huaycochea (1994).



Figure 7.6 Interior bins from a large Type 2 storehouse at Cheqoq.

Roofed area does not necessarily provide a straightforward measure of storage capacity. Although ventilation features have been observed in both small and large Type 2 storehouses, the largest structures contain rows of mud-plastered bins in their interiors (Figure 7.6). Whereas the single chambers found in Type 1 structures might reflect the production of a particular field or the work of a tributary unit, bins represent extensions of the domestic storage apparatus that reportedly held food belonging to a given individual or institution. Bins have not been identified in smaller Type 2 storehouses, suggesting different storage practices within and between sites.

Distribution of Inka Storage Complexes to the North and West of Cuzco

A series of full-coverage surveys in a twelve-hundred-square-kilometer region to the north and west of Cuzco—an area known to contain

several royal estates and state installations (see [Figure 7.3](#))—identified more than twenty sites with Inka storehouses, most of them close to the Sacred Valley ([Table 7.1](#)) (Covey 2014).

Survey evidence indicates considerable diversity in the size and location of storage architecture. The most accessible and visible storage architecture often consists of single structures or small complexes (e.g., VS-017, Pachar, CY-87), often situated a few hours’ travel time from Inka country palaces. Surface pottery from these installations demonstrates strong Inka affiliations, suggesting that their construction reflects imperial administrative practices. Stylistically, such structures might represent an Inka aesthetic program to communicate abundance across the landscape, a way for elite messages to echo at a distance from royal centers.

Intermediate-size storage complexes tend to be located closer to terrace complexes of royal estates, but a few hundred meters above the valley floor in locations conducive to drying and preserving food. Sites like Iglesiayuq and Inka Racay appear to belong to production infrastructure associated with royal estates, and they have counterparts elsewhere in the Cuzco region (e.g., Taucaray, Sillkinchani, and Qhataqasapatallaqta) (Huaycochea 1994; Niles 1999; Protzen 1993).

The largest surviving storage complexes—Cheqoq, Wayna Qollqa, and Machu Qollqa—lie several hundred meters above the valley floor, at a distance from royal estates and agricultural infrastructure. Despite their remote locations, these complexes are found in areas where noble lineages claimed to have herds and retainers (e.g., Quave 2012). Although surface collections from Wayna Qollqa show a clear imperial Inka affiliation, Cheqoq and Machu Qollqa both have strong Late Intermediate Period (LIP) components. Architectural variations indicate multiple construction phases, and excavation results reveal a pre-imperial use of some storage structures. The Inka expansion of these facilities may derive from preexisting local use, as Cheqoq and Machu Qollqa both lie near LIP village clusters (Covey 2014). The higher elevations of these sites might also present better conditions for long-term storage. Excavations at Cheqoq and Machu Qollqa have revealed Inka domestic components associated with the storehouses, perhaps residences of administrators.

<i>Site</i>	<i>Description</i>
VS-017	Three Type 2 structures built in a row as a single complex
Pukara Pantillijlla (VS-176)	Three possible Type 1 structures at an early Inka secondary center
Iglesiayuq (VS-249)	Three single-chamber Type 1

	structures, at least two small Type 2 structures
Qenqo Raqay (VS-270)	Six Type 2 structures arranged in two rows
VS-286	Two possible Type 2 structures
VS-325	One Type 2 structure
Pillquwayq (VS-345)	At least one possible storehouse
Minasmoqo (VS-394)	Four storehouses, type uncertain
Tunasmoqo (VS-395)	Three or more possible small Type 2 structures
VS-398	Four small circular and semicircular structures
Pisay (VS-409)	Six to eight possible Type 2 structures near ceremonial sector of royal estate
Cheqoq (X-075)	More than twenty large Type 2 structures
Wayna Qollqa (X-108)	More than thirty-five large Type 2 structures
Machu Qollqa (X-141)	Approximately thirty medium and large Type 2 structures
Pachar (X-235)	One Type 1 with four chambers, remains of other possible storehouses
Tambo Real (X-422)	Remains of unknown number of storehouses
Yawarmaki (CY-19)	One Type 1 structure with five chambers
CY-79	Two large Type 2 structures
CY-87	One small Type 2 structure
Pusaqraqayniyuq (CY-92)	Eight single-chamber Type 1 structures in two rows
Inka Racay (CY-139)	Six or more Type 2 structures in two rows (Niles 1999)

Table 7.1 Architectural Description of Storehouses in Survey Areas North and West of Cuzco

Contexts and Contents of Rural Inka Storehouses

Survey collections are valuable for discussing the distribution of known storage architecture, but only excavations can demonstrate the chronology of use and permit in situ recovery of stored goods. Excavations at several Inka storage complexes in the Cuzco region

provide comparative samples of artifacts and macrobotanical remains, although not all work has systematically documented the organization and use of interior space in storehouses. Excavated assemblages provide further evidence for the chronology, function, and organization of storage in Cuzco; work adjacent to storage complexes offers a comparative data set on associated habitation contexts, adding perspectives on domestic consumption patterns.

Excavated Ceramic Assemblages

Excavations in Cuzco storehouses have yielded LIP (including Killke), Inka, and colonial pottery in variable quantities, a pattern consistent with results from surface collections. Huaycochea's (1994) test excavations in Type 1 storehouses in the Patakanha Valley encountered a modest assemblage similar to that reported from provincial regions: high percentages of undecorated Inka storage jars (e.g., D'Altroy and Hastorf 1984: 343; Morris 1967). This contrasts with assemblages from recent excavations in Type 2 structures closer to Cuzco. At Cheqoq, the 2009 excavation of a cross section of a storehouse by the Cheqoq Archaeological Project (henceforth CHAP), directed by Quave, encountered mostly utilitarian and local LIP pottery (Quave 2012). Use of the storehouse began prior to Inka expansion into Maras, though other excavated structures at the site attest to its expansion during the imperial period. The structure excavated by CHAP yielded small percentages of imperial Inka ceramics, contrasting with Guevarás (2004) excavation of other storehouses at Cheqoq, for which he reported larger proportions of imperial pottery. Polychrome Inka and Inka utilitarian vessels comprise roughly 80 percent of Guevarás analyzed assemblage, and the remaining material consisted of Killke and other unspecified types.

Storehouses at Machu Qollqa also indicate a pre-imperial facility that grew during the imperial period. Type 2 storehouses yielded high percentages of LIP pottery that excavators identified as predominantly Killke. In visits to the project laboratory, we observed a significant local LIP component in the excavated assemblage. Excavators encountered a small sample of decorated Inka pottery, made from a different ware from that identified at Cheqoq. Distinct Inka ceramic assemblages at the two sites might indicate different ceramic workshops, different stored goods, or both. Recent excavations report larger proportions of Inka and colonial pottery in the smaller storehouses at Machu Qollqa (Valencia Sosa 2004).

Despite variations in the recovery and analysis of pottery in Cuzco storehouses, the excavated ceramics clearly differ from provincial

qollqa assemblages. Whereas the latter are imperial-era contexts where imperial jar forms predominate, the Cuzco region has facilities established prior to the first Inka campaigns beyond the Cuzco region. Excavated vessel forms in Type 2 structures are more diverse and have higher percentages of decoration, suggesting distinctions in the social activities occurring as surpluses were preserved, stored under guard, and removed for consumption. Large Type 2 structures with clay storage bins should have fewer of the large undecorated Inka jar forms commonly found in provincial storehouses. This seems to be the case at Cheqoq, where Guevara (2004) encountered modest samples of narrow-mouth Inka jars, with more abundant remains of plates, bowls, and cups, many of them decorated. CHAP excavations in a nearby storehouse encountered a similar breadth of vessel forms (two narrow-mouth jars, a wide-mouth jar, a pot, and a plate or bowl), although there were fewer decorated vessels.

Excavated Botanical Remains

The prominence of maize in the Inka economy and state religion makes it tempting to assume that storehouses held vast amounts of the state crop (Table 7.2). Maize has appeared in many excavations but not all. Huaycochea (1994: 157) identified small quantities of maize cob fragments in Thve units at Peñas (near Ollantaytambo), and Pilco’s excavations at Willka Qollqa in the Cuzco Valley recovered charred maize kernels (Pilco 2006). The botanical remains from other excavations do not appear to include maize. For example, excavated storehouses at Pumamarca lacked maize remains but showed evidence of unidentified roots and leaves (Huaycochea 1994: 157). Huaycochea excavated an unidentified fruit seed at Peñas, indicating that cultivars other than maize were indeed stored there. It is important not to make too much of the available botanical evidence without considering variations in site taphonomy and methods for recovering, processing, and analyzing samples.

<i>Complex</i>	<i>Taxa</i>	<i>References</i>
Peñas	Maize (rachis, cupules), unidentified vegetal material, unidentified fruit seed	Huaycochea 1994
Pumamarca	Unidentified vegetal material	Huaycochea 1994
Willka Qollqa	Maize (kernels)	Pilco 2006
Cheqoq	Maize (kernels, cobs), chuño, quinoa/kiwicha (seeds),	Bertone 2011; Guevara 2004; Quave 2012

	possible Phaseolus (seeds), possible ichu (stalks), verbena (seeds), muña (stalks)	
Machu Qollqa	Tuber, quinoa/ kiwicha (seeds), cactus (seeds), unidentified stalks	Eulogio Alccacontor Pumayalli and Victor Qhawana, personal communication, 2010; Bertone 2011; Quave 2012

Table 7.2 Botanical Taxa Identified at Cuzco Storage Structures

For example, Guevara (2004) identified maize kernels and cobs and *chuño* (freeze-dried potato) through visual inspection during excavations at Cheqoq. CHAP’s 2009 storehouse excavations at the same site recovered macrobotanical remains from hand recovery and flotation samples, and systematic analysis by the Laboratorio de Investigaciones Arqueobotánicas del Perú (LIAP) identified carbonized maize kernels, quinoa or kiwicha, verbena, muña, and possibly beans and *ichu* grass (Bertone 2011). At nearby Machu Qollqa, excavators allowed us to collect bulk samples for flotation in 2010. These yielded quinoa or kiwicha in both of the Type 2 storehouses sampled (Bertone 2011), and excavators at the site have also visually identified carbonized tuber remains during the course of fieldwork.

Together, the ceramic and botanical data from excavated storehouses in the Cuzco region indicate storage practices that differ from provincial *qollqas*. They also suggest functional variation among storage sites in the Inka heartland, and even within different sectors of larger storage facilities. Although more research is needed, it appears that a wider range of activities took place in the Cuzco storehouses than in a typical provincial *qollqa*, presumably because depositing stored goods in a provincial *qollqa* represented the fulfillment of a state-mandated tributary task, rather than an important collective process of laying away stores for noble households and those serving them.

Discussion and Conclusion

Some of the differences observed between storage in the Cuzco region and Inka provinces might be attributed to chronology, function, style, or social affiliation. Some Cuzco storage facilities (especially Type 2 structures) could reflect early Inka storage practices (Morris 1992), whereas the single-room *qollqa* of provincial regions (especially round

forms) would reflect imperial-era practices. There is evidence that some storehouses in Cuzco predate the imperial period, although it is also clear that the architectural form continued to be built and used in architecture associated with later Inka rulers.

Conversely, some Cuzco storehouses might have had a distinct function from that of provincial *qollqa*. Protzen (1993) has studied the architecture of Type 2 storehouses to evaluate their potential to circulate air for drying and preserving foodstuffs, and the presence of ventilation features and bins in recently excavated Type 2 structures indicates additional features enhancing these functions. Morris's (1967) excavations at Huánuco Pampa encountered evidence of tuber preservation in rectangular (Type 1) structures, with circular buildings used to store maize that had been dried, shelled, and placed in narrow-mouth jars. The initial work of processing maize, tubers, and other crops appears to have occurred outside of Inka provincial centers, whereas such work might have been performed on site at some storage facilities in the imperial heartland.

The distinct Cuzco storehouse architecture might have developed to communicate a different ideological message from that conveyed in provincial contexts. We have suggested that provincial storehouses served as a record-keeping mnemonic, and that structures might have been linked to particular labor units and productive lands, rather than being filled to capacity as goods arrived at a site. Provincial storage complexes visually dominated the landscapes surrounding administrative centers and along the royal highway corridor. In the Cuzco region, the maintenance of a distinct structural form (Type 2) might communicate abundance and domination in the idiom of the royal estate system. That is, Type 2 structures identified the power and domains of noble Inka families and their deceased royal founders whose mummies still retained putative ownership over estate resources. The presence of dispersed small-scale complexes in the heartland suggests different administrative practices in the noble lineage-administered storage in Cuzco when compared with provincial facilities.

Related to functional and stylistic arguments, Cuzco region storehouses might differ from provincial ones because different social groups used them. Long strings of small single-room structures might facilitate the work of a *quipu* specialist in monitoring the labor of provincial labor units transporting preserved foods from state fields to storehouses, but interior bins in larger Type 2 storehouse complexes in the Cuzco region suggest a more private domestic communication of the 'family' of people who served a particular noble household and were fed from its accumulated stores. Where strings of *qollqa*

symbolized the administrative aspect of Inka sovereignty—as lord (*apu*) over a hierarchy of administrators (*kurakas*)—a facility for processing and laying away estate stores could communicate the social power of Inka nobles as lords (*yayanq*) or ladies (*mama*) governing the kin and servants making up their household and retinue.

Considering this, we suggest that most Cuzco region storehouses should not be interpreted as comparable to provincial *qollqa* complexes. Some small complexes, perhaps including single valley-bottom structures, might have functioned as *qollqa*, possibly holding surpluses to feed travelers or local officials. Larger complexes might instead represent what would more properly be called *masana wasi* or *churakuna wasi*. The presence of the *masana wasi* would indicate that in the Inka imperial heartland representatives of the nobility and the state religion directly supervised the drying and preservation of staple goods coming from their lands.

Such interpretations have implications for understanding Inka political economy. It would mean that most storage architecture seen in Cuzco today represents resources managed outside the political realm. Instead, the noble economy dominated the most productive areas, with rulers and their wives also designating resources not expropriated from existing local communities for use by the state religion. Identifying some storage facilities as *churakuna wasi* acknowledges that royal estates were more than country palaces—they included lands, herds, special resources (like salt pans), and a diverse constituency of special laborers. Some estate workers served Inka families as subordinate members of their households, while others performed temporary service extracted from the provinces by an administrative hierarchy invoking the name of the ruling Inka.

The living ruler and his family benefited from provincial labor used to improve agricultural infrastructure and produce wealth goods, which were redistributed as gifts from the ruler. This suggests that the provincial political economy ultimately generated surpluses that were used to shore up the status of the ruling Inka family, which accords with the Inka practice of split inheritance that appears in numerous Colonial sources (e.g., Cieza de León 1988 [ca. 1550]: chap. 11). Beyond the Cuzco region, Inka political economy emphasized staple surpluses to fund the improvement and maintenance of infrastructure, to support the military, and to offer periodic support for individuals and kin groups so that they could remain autonomous and provide labor service to the state in the name of the ruling Inka.

Returning to the issue of risk, it is possible to see how surplus production and storage worked toward different ends in the Inka heartland and provinces. In the Cuzco region, the noble economy

developed as an extension of the domestic economy, with the ruling family provisioning other households from surpluses produced on its lands or brought to the capital as tributary labor. Betanzos describes Inka-supervised marriages as creating new households with rights to state food support and the protection of their private property. The chronicles state that the Inkas manipulated marriage practices in their provinces, as well, but the constitution of new households there created tributary obligations rather than privileges. Labor service given to the Inka generated surpluses to which the laborers had no social rights, simultaneously diminishing the ability of local households, kin networks, and communities to maintain their own risk-reduction strategies. The Inka state offered a limited degree of assistance when warfare, drought, and other hardships broke down family networks, but in ways that reinforced the social gulf between the ruler and the 'poor' recipients of his charity. Inka risk management aimed to stave off large-scale social risks such as factional disorder in the capital region, or armed uprisings in the provinces. Doing so imposed more proximate risks of food uncertainty on provincial households and increased the unequal distribution of social power across the empire.

Notes

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CHAPTER EIGHT

STOREHOUSE OF SEASONS AND MOTHER OF FOOD: AN ANDEAN RITUAL-ADMINISTRATIVE SYSTEM

Frank Salomon, Gino de las Casas, and Víctor Falcón-Huayta

Introduction¹

Until the mid-twentieth century, the village of Rapaz (Peru) managed its communal sector (fields, canals, terraces, pastures, and herds) through a ritual-administrative complex seated in a walled precinct. One of the precinct's two buildings is called *Pasa Qulqa* ('Storehouse of Seasons'). The other is a still-used sacred building, the home of a collection of *quipus*, where traditional authorities govern the common sector. It is called Kaha Wayi, 'Treasury House' Ethnographic information clarifies the relationships among storage, governance, ritual, and communal economy. This chapter emphasizes harvest collection and disbursal through the storehouse, an administrative system with a marked feminine symbolic association.

Here we take a route that starts with architecture and ends with song. Rapaz is known for its singular '*quipu* house,' an old structure containing a collection of cord records seemingly related to the Inka data medium (Ruiz Estrada 1981; Salomon, Brezine, and Falcon Huayta 2006: 59–92). The '*quipu* house,' however, needs to be understood as part of a larger unit: a complex of storage and redistribution that it once served to control. We demonstrate how in Rapaz, administrative and political work was fused with ritual service to *wakas* (Andean deities, many of which are deified mountains). The '*quipu* house' and the storehouse Pasa Qulqa are colonial to modern in chronology. Since the former still operates, and the latter operated within the lives of people still living, Rapaz offers ethnographic and ethnohistoric clues to the forms of 'vertical' political control, storage, and redistribution that ethnohistorians associate with Inka rule.

From a broadly anthropological viewpoint we attempt something more. The large literature deriving from the idea of vertical ecological diversity has told us much about the adaptive and technical agenda of productive zones (Mayer 2002) and their articulation, but it comes only part way toward showing how each zone's particular cultural

ethos—the range of feelings and questions that arise from behavior in it, and the symbols that express them—contributes to the articulated set of symbols we call Andean culture. The exceptions that do attempt this connection (Rivera Andía 2005: 129–156) suggest that a regular flow of expressive objects—songs, stories, emblems, recipes, to which one could add ledgers, *quipus*, tokens, and so on—constitutes the cultural counterpart of material ‘complementarity.’ The actual work of managing complementarity is often conducted by manipulating these emblems. The Rapaz precinct was a storage facility, but also a place for working symbols and information to organize the economy.

State storage is, of course, a classical topic in Inka and Middle Horizon archaeology (D’Altroy and Earle 1985: 187–206; Hyslop 1990: 377; Morris and Thompson 1985: 97–108; Sanders 1973: 379–428). Much less is known about community-level storage than about state storage. According to John V. Murra, the state warehousing that underpinned both armed Inka might and Inka ritual generosity redeveloped ‘an institution which had probably existed long before any state had appeared,’ and Murra thought it ‘possible that the [prehispanic] village did have some sort of community storage facility for emergencies’ to which each household contributed time or even the goods (Murra 1956: 210, 224). Murra notes that Blas Valera and Garcilaso Inka took this view, but chroniclers less indebted to Inka ideology do not confirm it. At Torata Alta numerous storage cells are interspersed among colonial *reducción* houses (Van Buren 1996: 343), but no central storage place is evident.

The Spanish colonial and following Republican transformation of the Andean storage system thus bears on the origin of Rapaz’s temple-quipustorage complex. The ‘Indian chronicler’ Felipe Guaman Poma de Ayala around 1615 applied the term *Sapçi o comun* to the community’s economic nexus: the storehouse, the fields supplying it, and the labor (including such specialties as dyeing) applied to them (Guaman Poma de Ayala 1980: 754). Guaman Poma was intensely interested in *sapçi*, mentioning it fifty-five times and idealizing it as an exemplary institution. His interest in *sapçi* far outweighs his interest in Inka state storage. He saw *sapçi* as a resource for reforming colonial inequities:

Your majesty should know that they should have communal capital (*hazienda*) which they call *sapçi*, of maize and wheat fields, potatoes, hot pepper, dry greens, cotton, seed, workshop, dye shop, coca, fruit groves. And in [it] the young ladies and the widows should spin and weave, ten women one unit of clothes in one term of the community *sapçi*, and they should have Castillian cattle and native ones, of the land of community and *sapçi*. (1980: 898)

Guaman Poma, unlike writers on the Inka state, emphasizes the importance of *sapçi* in relieving the poor and sick. Spalding (1984: 131) judged that in the first decades after invasion, ‘most of the profits gained by the *kurakas* from their activities went, at least initially, into the community stores or *sapsi*, to be used to meet the demands of their *encomenderos* and ... priests’

The case presented here relates to an earlier study about a village with a storage complex that retained *sapçi*-like functions well into modern times (Salomon 2004). That complex belongs to the village of San Andrés de Tupicocha, in the Huarochirí Province (Lima Department), in the upper Lurín River drainage. A review of its basic properties clarifies the new findings from Rapaz.

In Tupicocha, as in several nearby villages, storage was fused with civic ritual space in a large walled courtyard called *colcca* (‘storehouse,’ a Hispano-Quechua usage) or *casa de costumbre* (‘house of customary law’). The modern *colcca* is a large walled precinct, containing a rectangular central plaza, along whose longer sides stand raised platforms. The outer part of each platform in turn supports a line of rectangular roofed chambers that formerly served as storage cells. The inner edge of each platform today functions as raised seating for spectators, but probably was designed as space for handling stored goods. The precinct has only one gate, but each cell has a separate door.

The *colcca* is home to the annual *Huayrona* or ‘town meeting,’ January 2 and 3. At that meeting officers mark out its sacred space with a shrine and perimeters traced by bunches of puna grass. During the *Huayrona* all authorities are held to account and then yield office to their successors (Guillén de Boluarte 1958: 92–93). The authorities include officials of the modern hierarchy, but also the *camachicos* (‘order-setters’ in Hispano-Quechua) or presidents of the constituent *ayllus* as well as the *varayos* or staff-holding traditional officers. The village’s patrimonial *quipus* are displayed in the *Huayrona* as regalia of the *ayllu*, and as a memento of the *quipu* accountancy formerly practiced there. Tupicochans say that the goods formerly stored in the *colcca* were harvested in community fields (rather than contributed by members) and earmarked for community expenses, notably the major festivals. The whole ‘town meeting’ is a matter of civil customary law framed in an ethos of the sacred, part Christian and part Andean.

In the pages that follow, we study a *sapçi*-like complex from several river valleys north of Huarochirí. The complex has a different architectural structure and a somewhat different ritual regimen but shares with the Tupicocha complex the basic purpose of controlling production for communal use, storing it, and ritually convening the

authorities responsible for it. As in Tupicocha, the precinct unifies sacred space, plaza, warehouse, and *quipus*. Rapacinos, unlike Huarochiranos, do not use the term *Huayrona*, but similarities of practice justify using the term *Huayrona* as a generic term for this complex.

The Village of Rapaz and the Rapaz Research Project

The village of San Cristóbal de Rapaz with its *Comunidad Campesina* (corporation of the commons) bearing the same name is located on the west slope of the Sierra de Raura, in the upper Huaura River drainage (Province of Oyón, Department of Lima). Its nucleated center occupies a spur high above the uppermost reach of the Checra River, at 4,000–4,050 meters above sea level (Instituto Geográfico Nacional [del Perú] 2000: 1549 [22-j]). The densely built ‘reduction’-style village stands a little below the boundary between spacious high-altitude pasturelands and restricted farmlands (many terraced). The farmlands include a band of dry-farmed fields under sectoral fallowing (Guillet 1981: 139–156) and an irrigated lower band near the river. The 2007 census registered 436 inhabitants (Peru Instituto Nacional de Estadística e Información 2010). A variety of Quechua resembling the ‘Ancash-Huaylas’ described by Parker (Parker and Chávez 1976b) coexists, in decline, with Spanish.

In 1972 the Polish archaeologist Andresz Krzanowski heard of Rapaz’s remarkable patrimony, including its *quipus* (personal communication, 2006; Krzanowski 1977: 137; 1978: 201). Arturo Ruiz Estrada (1981) of San Marcos University was the first visitor to publish scientific reports. In 1995 Pablo Macera published, with Ruiz, a photographic book about Rapaz’s remarkable painted church (Macera et al. 1995).

The corporation of the commons owns the Rapaz patrimony and protects it earnestly. Although some parts, including the *quipus* and the storage chambers, are no longer used in their original functions, the precinct as a whole forms a cherished ritual space. Only the community vice president, in his role as *kamatsikuq*, or head of the traditional agro-pastoral authorities, is privileged to give access. The ‘*quipu* house’ is especially sacred. Nobody may approach without a legitimate reason. Any visit requires coca offering and invocations. Nearly all Rapacinos (with evangelical converts in dissent) firmly believe that the complex is their vital channel of communication with the animate mountains, whose gift of rain is their greatest need. At the same time, Ruiz’s work has made villagers aware that outsiders are interested, too. Because they regard scientific interest as legitimate,

and because they see the *quipus* as a glory of their village, villagers do allow the vice president to show visitors around. In 2005, one mass visit organized by a Lima NGO brought some three hundred.

The Rapaz complex therefore presented novel and delicate issues of research practice. In 2003, when Salomon began negotiating terms of scientific access with the community officers and the assembly, they expressed concern about the poor condition of the *quipus* (damaged by moths, fungus, smoke, and physical stress). Twenty years earlier they had tried to make a protective case. In 2004, they offered study access in return for conservation work that would allow uninterrupted dual use. Because living cultural practice is a large part of the site's value, our project was framed to include ethnographic and ethnohistoric research by Salomon, as well as study of the precinct. The conservation architect Gino de las Casas designed the repair and stabilization measures for the buildings, and a restoration technician, Edgar Cento Farfán, carried them out. The archaeologist Lic. Víctor Falcón Huayta studied the immediate surroundings of the buildings. The textile conservators Rosalía Choque Gonzales and Rosa Choque Gonzales cleaned the *quipus* and cooperated with Carrie Brezine in describing them. Renata Peters, a museological archaeologist, designed the protection measure for the '*quipu* house' and worked with the architect Nelly Faustino to build a *quipu* case. At all times the work was supervised by community vice president Víctor Gallardo Encarnación or other members of the community directorate. The village's official ritualist, D. Melecio Montes, carried out the community's *mesas calzadas* (rites of offering to the divine mountains) to ask permission. Two village women received special training in basic textile conservation.

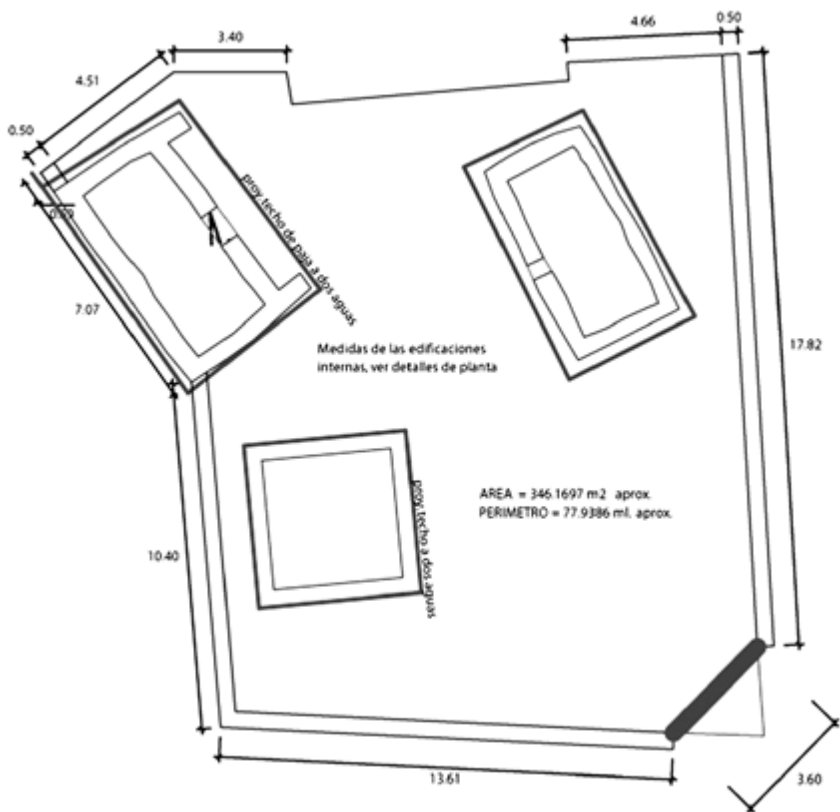


Figure 8.1 The ritual precinct of Rapaz. The structure at bottom, a temporary site laboratory, has been removed.

The Architecture of the Patrimonial Buildings

The ritual-administrative precinct of traditional governance (Figure 8.1) occupies an area of 346.17 square meters, close to the eastern edge of the village, on the same block as the famous painted church. One side of it lies along the boundary between the two traditional moieties, Allauca and Lamash. The precinct is surrounded on two sides by a recently rebuilt fieldstone wall with one large gate and a small lateral entrance, later filled in, and on the other two by rammed-earth walls backing onto private residences. It contains two buildings: Kaha Wayi, the 'quipu house' (upper left in Figure 8.1) and the storehouse Pasa Qulqa (upper right in Figure 8.1). The two are roughly aligned, facing each other along a northeast-southwest axis that forms an angle to the street grid. The walled plaza is unpaved and empty save for two electric utility posts, but excavation showed signs of heavy use both recent and historic.

The name *Kaha Wayi* consists of a Spanish root, *caja*, ‘treasury,’ and a Quechua one, *wayi*, cognate to *wasi* in southern Quechua, meaning ‘house.’ As for Pasa Qulqa (Figure 8.3), *Qulqais* is cognate to southern *qullka*, ‘warehouse.’ The adjective *pasa*, cognate to *pacha*, means ‘time, season, weather.’ Asked to translate the name, villagers render Pasa Qulqa as *depósito del tiempo* (‘storehouse of time’ or ‘of weather’), or else *depósito estacional* (‘seasonal storehouse’). A few call it *misia qulqa* (‘lady storehouse’).

Kaha Wayi, the ‘*quipu* house’ (Figure 8.2), is the more frequently used part of the patrimony. It functions as the meeting place of the traditional authorities, particularly for the important New Year’s meeting described below, and for the *mesas calzadas* in which the designated ritualist (*awkin*, *vendelhombre*) communicates with the owners of rain. It is rectangular, with walls of irregular stone and earth mortar, and with adobe gables. A single northwest-facing door gives access to the main chamber. A smaller opening in the southwestern gable 2.8 meters above the inside floor level opens into the now-empty attic. The endwalls project past the main façade to form two buttresses. A low stone bench of a type common in regional prehispanic architecture runs along the base of the façade. It afforded seating for officers whose low rank allowed hearing but precluded seeing the rituals within Kaha Wayi. The main entry, a Dutch door, allowed sound and the ritually valued smoke of incense to reach these persons while precluding entry. Long eaves sheltered the outer bench.



Figure 8.2 Kaha Wayi, the ‘Quipu House,’ 2004.



Figure 8.3 Pasa Qulqa, the old community storehouse, 2005.

The floor of the main chamber is compacted earth. Thick trunks of *quinual* (*Polylepis racemosa*) sustain the upper floor, seventeen centimeters thick, whose top surface was finished with a layer of smoothed clayey earth. A small cross made of puna straw was discovered sealed under this layer.

All around Kaha Wayi's interior in the main or lower chamber run adobe benches about thirty centimeters above floor level, for the officers and ritualist. A niche high on the northwest wall holds candles and remains of flowers.

Kaha Wayi's furnishings are highly sacred. The collection of *quipus* was in 2003 and 2004 draped in seeming disorder over a stick, which was in its turn hung from the woodwork of the upper floor ([Figure 8.4](#)). This hanging rack lay parallel to the southeast or rear wall. Contrary to often repeated assertions about a giant *quipu*, it is in fact an assembly of 263 discrete cord objects. They are of a different basic design from Inka *quipus*, having no pendants, but rather a single 'monoquipu' cord along which significant objects such as wool tufts, pompoms, rawhide tags, and figurines, are attached. Even more important in the eyes of Rapacinos is the altar or offering table, which stands in the more westerly part of the chamber. Covered with a double cloth, it permanently holds three small gourds for liquid offerings (*jurka*), a coca bag (*walki*), and a small lime gourd for consuming coca ([Figure 8.5](#)). A large pile of coca leaf deposited by

visitors obscures most of the surface. From the ceiling hang twenty-six diverse objects dedicated as past offerings. New ones are occasionally added. A large broken pot on the floor serves as a censer for burning llama fat. Dry plant remains under the altar attest to the *Raywan* ceremony described below.

Pasa Qulqa (see [Figure 8.3](#)) is a robust building made to sustain great weights. The storehouse resembles Kaha Wayi in its overall shape and size but is constructed differently. It contains no furnishings now considered sacred, nor does it function any longer for storage. It is, however, still used frequently for nighttime community rituals.

Pasa Qulqa's exterior shows traces of having been plastered with earthen mortar and lime. It is rectangular with three levels. Its foundations are forty-two centimeters to fifty-six centimeters thick and about a meter deep. The walls are of like thickness, 2.86 to 3.25 meters tall, and made entirely of stone, including the gables. Around all four walls runs a projecting cornice of flat stones at 2.86 meters in height. This feature is also common in local Late Intermediate villages, whose ruins are numerous all over the district. Indeed Rapaz seems to stand atop one such. The masonry is less than regular, but stones are consistently placed flattest side outward. There are no exterior buttresses or benches.

Two of Pasa Qulqa's three openings are on the side facing Kaha Wayi. The lower of these two openings gives access to a floor today sixty centimeters below exterior ground level, with a ceiling height of 1.3 meters. Heavy trunks of *quinual* seated on reinforced wall sustain the middle floor, which retains its surface of smoothed earth. Unlike the upper floor of Kaha Wayi, it is reinforced with stone. The access to the middle floor is through the higher of these two openings. The middle floor had 1.25 meters of headroom. Both of these openings had double stone lintels and thick stone thresholds. The upper floor was built like the middle one, but it has collapsed. Access to it was through an opening in the gable at 2.73 meters above the exterior present ground level. It was formerly reached by an exterior stairway of which nothing now stands. It is usual for prehispanic storage buildings to have small openings with obstructed access, as does Pasa Qulqa, perhaps to facilitate regulating entry.



Figure 8.4 The quipu collection with 2004 vice president (kamatsikuq) Toribio Gallardo.



Figure 8.5 The altar or offering table in Kaha Wayi.

The productive system controlled from the precinct was and still is a typical central Andean agro-pastoral system, with strong communal controls. Rapaz does not allow any private holding of land, only use by community permission. Warehousing in Pasa Qulqa was formerly another central element of that control. Other rules of communal control have persisted, primarily concerning pasture use and land use under sectoral fallowing. Although the community now controls production much more than it does distribution or consumption, lively ethnographic memories of the old system allow a fuller reconstruction of what was still, not so long ago, a redistributive economy reminiscent of *sapçi*.

Only members of the recognized peasant community have usufruct rights, apportioned annually. The member unit is the household, as represented by one inscribed member. Surface improvements (e.g., houses, walls) built by households are property and may be sold. Users may rent or delegate their use rights for finite periods, but the community retains authority to revoke or reassign them.

Villagers draw a fundamental distinction between the *chacras* (planted fields) of the *comunero* and those of the community. The traditional form of the principle was that in every production zone, the community reserved at least one portion of land resources as capital for its collective or 'supra-household sphere of production' (Guillet 1978: 89–105). The fruit of these reserved lands was reserved to support or improve capital goods in common use, such as irrigation canals, roads, pasture fences, lodging for visitors, meeting spaces, including the Kaha Wayi-Pasa Qulqa precinct itself, and, more recently, schools and vehicles. These communal sectors also underwrote ceremonial expenditures used on *faenas* or collective workdays. The same sectors also supported the rituals conducted by the contracted community ritualist, the patron saint's days, and some other festivals. Proceeds of its sales backed self-defense, whether through litigation or through peasant *ronda* patrols. The common sector similarly financed travels by delegates of the community, hospitality to its guests, such as technicians, and emergency relief in case of famine or family hardship. Kaha Wayi administered and consecrated all these applications. Pasa Qulqa contained its products and controlled and disbursed what they required.

Pasa Qulqa had one other *sapçi*-like function: it was the seed repository. From harvest to sowing, Rapaz depended on it to store seed for the collective sector and, optionally, for households.

The application of the *sapçi* principle varied by production zone or vertical tier. It has been better preserved in some zones than in others.

Rapaz's main wealth is high-altitude herding of sheep, cattle, and camelids. The pastoral sector occupies all of Rapaz's extensive puna holdings. At present the larger share of the puna is available as open range to householders. However, the community as such reserves large puna tracts for animals held as collective endowment. It owns a herd of each species (llama and alpaca, sheep, cattle, goats). The community annually chooses an officer, the *mayordomo* or *mayor*, to manage community herds, and he in turn names one herder for each of the species. The *Mayor* together with his herders takes responsibility for rounding up, curing, mating, marking, milking, shearing, slaughtering, and keeping records of the herd, including records of cash transactions. Transactions involve animal transport, veterinary services, purchase or sale of stock, and so on. These officers also conduct the rites for animal fertility (Aranguren Paz 1975: 103–132; Flores Ochoa 1976: 115–134) at a subsidiary ritual house on the heights. Pasa Qulqa's bottom or ground story is associated in popular memory with animals, buried animal sacrifices (*qarakuna*, 'feeding,' is still practiced there), stuffed trophy skins (puma, vicuña), and certain tame animals that reputedly lived in or near it. It may be that products from the herds were stored there.

As for agriculture, Rapaz also has a substantial band of lands for dry-farming at village-center altitude and partway down toward the Checras canyon. The regimen is at present an eight-sector *raymi* or sectoral fallowing system (Hervé, Genin, and Rivière 1994; Orlove and Godoy 1986), one sector of which was among the lands Rapaz won back from a latifundium during the agrarian conflicts and reform of the 1960s. Potatoes are planted in each sector (*anqi*) in its first year of use; oca, mashua, and ulluco in its second; and barley or quinoa in its third. Each is then fallowed five years, with stubble grazing permitted. Each *comunero* is allotted one or more plots in each sector, so each household uses at least eight plots. These assignments today occupy all the arable land.

But in the traditional order, at least one large parcel in each sector was reserved as *Kumun chakra*, or community field. Some recall that the ideal was two, perhaps corresponding to moieties. The community levied festive labor days for their plantings, cultivation, and harvests. The songs (*juywa*) and costumes for these occasions are well remembered. These occasions entailed strict control of attendance and of products. The harvest was counted while being bagged at the fields and counted again on delivery at Pasa Qulqa, where it was stored. Seed tubers were set aside from consumables and stored separately, in Pasa Qulqa's third or uppermost story. Seed from Pasa Qulqa was sometimes made available to households. The main bulk of the crops

was reserved for the community expenditures listed above. These expendables were stored in the second or middle story.

The lowest production zone is an irrigable band at the lower edge of Rapaz's territory. Today it is used mostly for feedlots. A portion of this water-rich strip is reserved for communal use, so that cattle from the communal herd on the high pastures can eat an enriched diet before milking. The ritual complement of this irrigation sector was, as in many Andean villages, the canal-cleaning cycle *yarqa aspiy*, often translated as 'water festival.' Its climax, the welcoming of the new water, took place in Kaha Wayi. It is no longer practiced because PVC tubing obviates the need for cleaning.

In the 1970s and early 1980s Pasa Qulqa and Kaha Wayi were neglected, and at one point, in 1981, Pasa Qulqa was almost reassigned as a house site. Ruiz Estrada's visits strengthened the will to defend them, at least as patrimony, and since the 1990s they have been jealously guarded.

The peasant community today elects the usual 'constitutional' hierarchy of officers, and practices nationally normative bookkeeping, taxpaying, and legal registry. At the same time it maintains within its own bosom a traditionalist inner government that continues to enforce the abovementioned regime of usufruct rights. This inner government is officially called the *Comité Agropecuario* ('Agro-Pastoral Committee'), and the community vice president, in his capacity as *kamatsikuq*, functions as its head. The vice president-*kamatsikuq* thus forms the hinge between state-defined law and a traditional *varayo*-style hierarchy.

Members of the Agro-Pastoral Committee are known as *balternos*. They wear Andean formal clothes (brown poncho, coca bag, hat with floral ornament) to meet in Kaha Wayi or to attend assemblies where they represent Kaha Wayi. While they no longer administer *kumun chakra* nor Pasa Qulqa warehousing, they do still administer both rituals and rules for agriculture. They are responsible for patrolling the *anqi* sectors to monitor correct use, for impounding stray animals, for supervising the usufruct plot system, for consulting with the various NGO visitors on agricultural matters, and for supporting the ritualist in his communications with the deified mountains. They also monitored the present research. The hierarchy of *balternos* varies slowly to meet changing needs. The *llavera*, or guardian of the livestock pound, and the *rematista* responsible for collecting fines on impounded animals are usually women. They are today the only women with rights to sit inside Kaha Wayi, but elder women say that in their youth all *balternos* sat with their wives in session. Almost all of the oral-traditional information about Pasa Qulqa contained here

comes from interviews of past *balternos*.

***Pasa Qulqa* and the Ritualism of Administration**

Kaha Wayi and Pasa Qulqa are not thought of as human cultural structures within a natural landscape. Rather they themselves count within one unified hierarchy of sacred places, including both natural and cultural ones. When asked about the sacred places one must invoke, Rapacinos mention at least the peaks called Yara Wayna, Qumpir Wayna, Saqsar Wanka, Waqrunchu, and Pilaw Qayán. But in the same series they also mention as places requiring veneration the spring of Tukapia, located on a hill right over the village, and both Kaha Wayi and Pasa Qullka within the center of the village. It is as if the last three represented ego's own neighborhood within the society of powerful beings. The nearby ritual points are places for communicating with still greater powers. Tukapia and the remembered 'well' of Pasa Qulqa are seen as oracles conveying the 'answers' of the greater beings. The ritual precinct is one's own virtual mountain, one's proximate and approachable superior amid the wider and more awesome kindred of the *jirka* ('sacred mountains').

This tendency is notable in terminology. The ritualist contracted to act in Kaha Wayi is called *awkin* or *vendelhombre* by his human constituency. But he himself says *awkin* or *vendelhombre* when speaking of still greater beings. No dichotomy of natural and supernatural is in play, but rather a single society within which rain, the harvest, and life itself are transactions. When transactions go poorly (i.e., in drought, epidemic, and so on) the ritualist makes heroic fasts within the precinct, followed by journeys to the glaciated heights where he demands Rapaz's interests.

Within the old regime of the *balternos*, therefore, the range of activities that we usually call 'administration' is fused with ritual. In the interest of developing a culturally richer idea of recent and perhaps prehistoric storage process, it is worth seeing how administration and worship meshed. For this purpose, the 'ethnographic present' is a date when the storage as well as the governance functions of the precinct was still in force. Elders with detailed memory of past cargos say the former had ended by 1945, but do not profess to know whether Ruiz was right in estimating 1931 as the end date of for active recording by *quipu*. Because matters of 'custom' are not noted in the community archives, we cannot be more precise than to say toward the middle twentieth century.

Potato planting in the common fields took place in October, cultivation and hilling from mid-February to March, and harvesting in

May or June after the rains. The other crops had offsets from this schedule and lesser ritual emphases.

As preparation for the harvest, in May or June, the *kamatsikuq* and his wife, who had the title of *ispinsira*, set up a ritual apparatus for storage. *Ispinsira* means ‘steward’ with female gender inflection. It is fairly common in Andean villages for women to hold roles of fiduciary trust. The *ispinsira* was an official, but at the same time a splendid ritual figure. Speaking Spanish, some villagers call her *mujer divina*, ‘divine woman.’ When appointed she prepared brightly colored luxury clothes and two decorated potato sacks of wool. Each bag would serve as a standard measure to hold one hundred kilograms of tubers.

The *ispinsira* was to *kamatsikuq* as female to male, and likewise Pasa Qulqa was to Kaha Wayi as female to male. Rapaz people speak of their storehouse as female, hence ‘lady Qulqa.’ She is the nurturing ‘mother’ of the community when her goods are disbursed. Pasa Qulqa was also the belly, as it were, that gave birth to infant crops in the form of seed tubers. In ritual context tubers are called ‘babies.’

In preparation for harvesting, the *kamatsikuq* would name two persons to be *alqasaku*, the controllers of the harvest. The title means ‘bag-lifter.’ As they measured in the *ispinsira*’s special bags, they moved it from the male sphere of agricultural governance to the female one of storage and distribution.

On the day when the villagers were called out to harvest, the *kamatsikuq* and *ispinsira* would be the first to arrive at Pasa Qulqa and unlock it. They arrived in flower-decked finery (the *ispinsira* always barefoot). They would bring along a second couple, the ritualist or *awkin* and his wife, who had the title *chukkas* ‘old woman,’ not in a pejorative sense but implying, as does the male title, ‘elder, senior.’ At Pasa Qulqa the four of them sang the *tinya* or ‘drum song’ of the harvest and took coca lavishly. A *tinya* singer is photographed in Rivera Andia (2005: 135, fig. 11.6).

As the villagers set out for the day’s work, one bag-lifter went to the field, the other to the precinct, so as to measure the crop in the two special, and equal-size, bags at both departure and arrival so as to prevent pilferage in transit. While villagers harvested the fields reserved for Pasa Qulqa, they enjoyed deluxe *pachamanka* lunches prepared at community expense by the *balternos*. *Pachamanka* is the earth-cooked feast, a sort of Andean luau. It was the duty of the *mayordomo* (herd master) and his herders to bring the animal ingredients, namely, meat and cheese on alternate days. The harvesters rewarded the herders with a sack of potatoes as if to underline the complementarity of herding and agriculture.

Each villager was responsible for transporting a portion of the crop. The load borne by a villager was called *winaychaniy* 'my fulfillment' (Parker and Chávez Reyes 1976a: 195). On arriving at the precinct plaza, the bearer presented it to Pasa Qulqa's bag-lifter for weighing and, perhaps in a past time, *quipu* recording. As the crop in the patio increased, so did the pitch of music, drinking, and celebration. Villagers remember the reception as being loud, joyous, and showy. The male-and-female motif was underlined. In whatever role, people took part as couples, and the occasion was taken as a celebration of fertility.

Once the whole crop was in Pasa Qulqa's patio, the bag-lifters separated it into three main parts, plus a fourth symbolic one.

The first category was seed: about four hundred to seven hundred kilograms. The best tubers were set apart as seed for the coming year, and the really special ones (*raywana*) as seed for the *kumun chakra*. Seed was kept in the top or third floor, called the *ispinsa*, under special care of the 'divine woman.' The second was expendable reserves: the officers stored an amount of tubers sufficient to cover community expenses and the feeding of the villagers themselves when engaged in *faenas*. It was saved in the middle floor. The remainder left after these were measured formed the third part, for redistribution. It was shared out in equal portions to the member households. A fourth category was the small bulk of symbolic tubers called *pirwa* 'granary.' The word is interesting because it is an archaism and a south Andean—perhaps Inka?—usage (González Holguín 1952 [1608]: 287). The few largest, prettiest, and most interesting tubers (e.g., double-bodied ones or ones that produced multiple above-surface plants) would be hung as *pirwa*, keepsakes of the harvest. *Pirwa* hung from the rafters of the topmost floor, the seed deposit. They were considered fructifying talismans, and were kept until the harvest of the following year. The bottom floor, as noted above, was apparently used for animal products and processes, not crops. It was decorated with animal skins. It was (and still is) the locale for animal sacrifices.

After the harvest, a major meeting took place in the precinct on June 24, a date probably representing the summer solstice and the midyear accounting and planning session characteristic of communities in western central Peru. This session included the *rimanakuy* or 'conversation,' a planning session for the second semester. At this season the *kamatsikuq* and his wife, the *ispinsira*, began the cycle of redistributing Pasa Qulqa's contents. If the year was bad, the *kamatsikuq* and *ispinsira* might periodically announce disbursements for consumption. Another sequence of redistribution took place in October, when the *kamatsikuq* and *ispinsira* gave villagers

portions of seed tubers. They were small, about three handfuls per comer. The main part of the deposited seed would be planted in the community plots.

As the Huarochirí Quechua manuscript observes, harvests attract visitors. A part of the harvest would be given away. The harvest especially beckoned people from the heights: herders eager to exchange their products (wool, thread, ponchos, dried meat, and so on) for vegetable foodstuffs. Some of the community's part of the harvest was available for bartering. It was considered important to acquire an animal for sacrifice in this fashion, and this 'outsider' animal was sacrificed in the bottom floor of Pasa Qulqa. A popular memory says that if visitors left their animals unprotected, the hosts could take them and sacrifice them without fear of reprisal, because sacrificial use was not considered theft. This interchange, with its note of antagonistic interdependence, calls to mind Duviols's (1973: 153–191) study of *huari-llacuaz* or herder-farmer relationships in central Peru.

Songs for Raywana, "Mother of Food"

A mystique of safety, plenty, nurturance, and enjoyment clings to Pasa Qulqa. 'Pasa Qulqa is food; Pasa Qulqa is nourishment. If we roof Pasa Qulqa well, there'll be food,' said one worker during the reroofing that took place during the present research. This remark referred to the building's magical potency to foster food, not its storehouse function, which had already ceased. As the rituals sketched above suggest, this nourishing power is related to femaleness. The *ispinsira*, leader in sharing out food from Pasa Qulqa, was the highest female authority. Together with the wife of the ritualist, she furnished a womanly counterpart to the ordinarily male face of authority.

In rituals that have to do with food, especially those connected with the precinct, food is never called by commonplace terms but rather by a term that means the crop as a living, female being. The term is *Raywana*. *Raywan* and *raywana* have been commonly translated 'mother of food' from the days of Peru's idolatry trials (1609 onward) up to the present. A goddess called Raywana occurs repeatedly in ethnographies of the departments of Huánuco, Cerro de Pasco, and Ancash. She is often represented by a male dancer disguised as the beautiful, womanly 'mother of the crop,' but in other communities she is a female dancer. Male *campesinos* dance alongside Mama Raywana's court and adore her (Cardich 2000: 69–108; Domínguez Condezo 1982: 29–33). Mythology about her is well documented (Domínguez Condezo 2003: 92–95) and was already captured by extirpators of

idolatry in Cajatambo at various places and dates in the decade of 1650 (Duviols et al. 2003: 241, 290–291, 313, 345, 427–428, 597–598, 604). Rapaz's preferred potato variety is called Raywana. Raywana potatoes are black on the outside with bright pink flesh inside and a whitish halo under the skin.

Rostworowski (1983: 72–75) sums up the gist of Mama Raywana's myth. Once the sole owner of food, Mama Raywana conceded the basic Andean foodstuffs to humanity only under cruel coercion. Humans persuaded certain birds to blind her by throwing fleas into her eyes. While Raywana was blinded, rubbing her eyes, humans kidnapped her baby *Conopa* and thus forced her to give over the cultigens. *Conopa* is an old term for small fetishes or talismans that stand ritually for crops or herds and foster them. So Raywana is conceived of as an abundant mother, but one with a potential grudge. She must be cultivated with tact as well as with love.

At Kaha Wayi, one of the most crucial acts of the year is the transmission of office to new *balternos* at New Year. It is ritualized as an encounter with Raywana: an encounter that is at once technical and ritual. Teams of outgoing and incoming officers visit the fields in use and bring back fresh half-grown plants, which are called *raywanas* (see [Figure 8.6](#)). They reported on the health of the emerging crop. Then they deposited these crop tokens or *raywanas* under the altar to receive honors during a nighttime ritual. The *raywan* in Kaha Wayi functions as a talisman for the crops in the same way that *ilas* function as animal talismans. In older practice the *raywanas* were actually planted inside Kaha Wayi. Sprouting in darkness, they produced a ghostly, stalky indoor counterpart to the planted field.

The sentiments that attach to the growing field, a young incarnation of Mama Raywana, become poignantly clear in a *tinya* or drum song sung on the occasion of planting the *kumun chakra*. In prosody and music it belongs to a common central Peruvian style, consisting of semantic couplets for the most part (Mannheim 1998). In the Rapaz area, but not elsewhere, each line is sung with a marked caesura at mid-strophe.



Figure 8.6 Raywan entrego: village officials bring crop tokens to Kaha Wayi, January 2, 2004.

The emotional background to the lyrics of planting songs is the feeling that human relationships with fields and crops are touched with guilt. As the myth says, agriculture bears some likeness to injury and theft. The words appeal to Raywana to forgive the injury people will cause her with the stab of the digging blade, so that she can later on wear the glorious green of a mature crop. It assures her that her babies, the tubers, will be lovingly treated when the harvesters and bag-lifters come to take them to Pasa Qulqa. The song was recorded by Teodosio Falcon, an accomplished retired ritualist.

Salomon discussed both the Quechua and a neighbor's Spanish rendering with bilinguals, but did not in that session work with a linguist to produce exact transcription or translation. The rough English rendering or paraphrase that follows is at least loose, and is intended only to suggest the content of the song. Proper linguistic treatment of Rapaz songs will appear in the forthcoming article 'El arte verbal en las canciones rituales quechuas de Rapaz,' by Luis Andrade Ciudad.

Potato plot, food mother, now is the time
 The digging blade lodges in you
 Mother of food, don't forbid this,
 That it now lodges in you,
 For it was foretold, this lodging of the blade,
 In front of everyone big and small.

Mother, no, don't say no
 Don't say no to the growing shoot.
 Soon your leaves will dance like wild grass on the mountain,

Though beasts stray through you, you'll dance and dance,
When the villagers are to arrive in you,
When the villagers are to be seen in you.
You'll spread yourself out like algae on water,
You'll be smooth as algae on mountain lagoons,
Mother of food, little mountain of plenty,
You'll spread yourself smoothly as algae on water,
Your leaves will wave like grass on the heights.

Long live, long live, the master of crops
Long live, long live, the master of herds!
How many hundred-pound sacks will you give?
With how many hundred-pound sacks will you load them?
Bag-lifter, don't say no,
You've already been chosen, you're already called,
Young guy, watchman, you're already named.
And old man, officer, you keep working
Old man, officer, you dig too.

We'll plant the babies, we'll lay them in
We'll plant the babies, we'll put them in place.
Let not one soul ever speak against it.
Field master, herd master, when you store the crop
You'll lay up dozens of dozens of hundred-pound sacks
Dozens of dozens you'll put in place.
Even if worms come, even if ice comes,
Even if worms come, even if ice comes,
[Field master] will fight off the freeze from the heights,
It is he who will beat back the ice.
The master of crops, he will defend
The field's fruits from worms in the soil,
To serve your babies for his own babies.
Long live, long live, the master of herds
Long live, long live the master of crops.
He will defend you for your babies,
He will put the worms to rout,
He will beat back the freeze from the heights,

He will protect from the stalking chill,
From the frost that descends, and the fungus that kills.

This poem bears some commentary. Like many Rapaz *tinyas*, it is a two-part poem, double in its address. It first addresses the nonhuman beloved (Raywana at the time of planting) with praises and promises. Then it addresses the human attendants of the beloved, exhorting them to make good their promises. There is an underlying metaphor of marriage: the injury a groom does his bride by penetrating her is compensated for in the glory of her fertility.

This promise of glory is expressed from the viewpoint of the predominantly puna-oriented Rapacinos. The high slopes with their icy lakes and endless waving grasses seem to lowlanders wild and shelterless, but to mountain herders they are the paragon of beauty. Agriculture, in their eyes, emulates the heights by smoothing and dressing the rocky, muddy hillside to make it more like the undulating puna. If the field allows the potato plants to grow, she will be clothed as beautifully as the high slopes. Raywana is told that her foliage will ‘dance,’ that is, wave gracefully, using the verb *waylay* ‘to be leafy, verdant.’ *Waylapa* is a high-altitude plant known for this quality and for its lovely flower. In the complementary strophe, Raywana is told that her leaves will ripple like the algae (*kushuru*, *Nostoc*) on the high puna lakes. Algae are admired for their graceful motion, their greenness, and their fresh taste. From her green maturity, Raywana will have babies, the crop of potatoes. When these babies leave their mother, Pasa Qulqa will become their home. There they will be valued and protected.

The human addressee translated as ‘field master’ in the English rendering is the *kamatsikuq* (an Inka and colonial Quechua title) today equated with community vice president. The closing lines, about his promise to defend the mother of food against freezes and plagues, refer not only to mobilizing community work but also to the *kamatsikuq*’s alliance with his ritualist. Together they must repel danger, even to the extreme of upbraiding and fighting the mountain *jirka* should they torment Raywana by sending hail or strong wind. ‘Herd master’ refers to the *mayordomo*. ‘Bag-lifter’ is the *alqasaku* discussed above. The lines about laying in sacks refer proleptically to putting them on straw beds in Pasa Qulqa.

Five or six months later, when actually harvesting and bringing the crop to Pasa Qulqa, a different *tinya* was sung. This example was also performed by Teodosio Falcón. Like the October example, it is a love song to Raywana. However, in June, she is no longer praised as tender

bride but as mature and nourishing mother. As with the foregoing verses, the following is merely a suggestive rendering, and readers are referred to the forthcoming work of Andrade Ciudad for a linguistic version.

Little Mother of Food, little mountain of plenty
Now it's time, now we'll carry you up
To Kaha Wayi, to Pasa Qulqa.
With the herd master, with the field master—
In their presence we'll put you away,
In the presence of old and young.
Let not one person say 'No';
Let not one person say, 'I can't.'
For the year we've guarded you;
For the year we've put you away.
You will breast-feed us, old and young;
Pasa Qulqa, you'll be our mother.
And now you're already put in place
In the presence of old and young.
Long live, long live the master of herds.
Long live, long live the mistress of crops,
Long live, long live the master of crops,
And long live the man who takes the lead.
Well now, man, stand and talk to us,
Well now, man, stand and tell us something.

The form of this song, with its double address to Raywana and then to her human attendants, is like the first. The central metaphor, of course, is Raywana's maturation and passage from the planted plot to Pasa Qulqa. Pasa Qulqa manifests Raywana as the nursing mother who will feed the community at her breast by disbursements from the stores. The reference to Kaha Wayi concerns the dedication of the new harvest in the ritual chamber, that is, honors to the crop token Raywan that was taken inside at New Year and that represents the crop in its gestation. 'Mistress of crops' translates as *ispinsira* and alludes to her centrality as the personification of food supply. As noted above the herd master or *mayordomo*, who supplied animal products to the harvesters and who would oversee the animal sacrifice at the end of the storage work, is also honored. The song ends with an invitation to the authorities asking them to declare the beginning of

the redistributive phase.

Conclusions

The archaeological and ethnohistoric record gives many reasons to see cycles of storage and redistributive disbursement as the very pulse of Andean political economy. These ancient records, however, are generally bare of the verbal and ritual culture that performatively guided people through these cycles. Exceptionally, Rapaz still practiced redistribution, ritual and all, through an active communal storehouse and Andean ritual precinct well into the twentieth century. These institutions resemble the colonial-era *sapçi* or communal storehouse as described (or perhaps prescribed) by Felipe Guaman Poma de Ayala at the start of the seventeenth century. In Rapaz, we can glimpse through material culture and popular memory an integral system of agro-pastoral control, including its ritual nexus.

Rapaz in the early twentieth century had a supra-household sphere of exchange based on separate endowments of pastoral land and on 'community fields' in each of the agricultural sectors. From these came the consumable crops stored in Pasa Qulqa's middle floor, the seed crops in its upper floor, and the animal goods in its lower floor. A hierarchy of annual agricultural officials controlled this sector ritual largely from the complementary ritual building, Kaha Wayi. A parallel hierarchy of herding officials also operated at cardinal dates inside the precinct. From the economic point of view, their function was to enforce correct sectoral fallowing and assign plots, to mobilize collective workdays (*minka*, *faena*) applied to the community lots, to feed those mobilized, and at harvesttime to organize the measurement, transport, storage, and gradual redistribution of the products. It is possible, but not certain, that the collection of patrimonial *quipus* held in Kaha Wayi contained the record of services villagers rendered to the supra-household sphere. In modern communal systems generally, documents of equitable contribution are crucial to villagers' willingness to comply.

In the pastoral sector much of the old system is still in effect. The community hall (*local*) still functions as storehouse of animal products, and on holidays the community authority still sponsors meat feasts. In the agricultural sector, communal controls remain in force, but the common fields have been partitioned to supply additional household usufructs. This change liquidated the storage and tuber-redistribution system, leaving Pasa Qulqa empty of crops.

The local understanding of this regimen was economic, but economic action was itself seen as fused with ritual presentation. The

entire productive environment was construed as a hierarchy of living beings, with single relational terms connecting villagers to higher-ranking humans, and humans to higher-ranking beings, such as the sacred precinct and the nearby oracle places. These in turn had as their superiors the great deified mountains. Any actor spoke of superiors in the idiom of seniority, using gender-bound relational terms. The villagers speak of superior officers, notably their contracted ritualist, as *awkin*, meaning 'elder, old man' (Parker and Chavez Reyes 1976a: 40) or *vendelhombre* (*bien del hombre*, 'human welfare,' in both Spanish and Quechua). But the ritualist in turn speaks of the superhuman beings to whom he is supplicant with the same terms. When the relation is female-focused, as in the case of the ritualist's wife, one uses the corresponding female term *chakwas* (Parker and Chavez Reyes 1976a: 50). *Awkin* and *chakwas* do not imply seniority in descent, for which there exist separate, generational terms (Carranza Romero 2003: 248). They do, however, imply power, including the power to give or withhold the conditions of growth. So descent depends on *awkin* and *chakwas*.

Powerful senior beings are imagined in variable degrees as strict and demanding, even punishing. The more senior the power one approaches, the more danger is involved. A great ritualist is a veritable hero of the punas, because he roams the icy heights in states of ritual asceticism to face the mountains themselves. Such relations involve formal obeisance. But the powers also respect valor. Every power owes beneficence if served well. When relations turn bad, humans may defy them or fight.

The characteristic transaction with *awkin/chakwas* beings involves three requisites: token, invocation, and sacrifice. One must put into the power's possession something that stands as token for the good that is needed. For animals the tokens are amulets (*ila*), and for crops consecrated plants (*raywan*). As tokens receive the benison of power, the things they stand for will flourish. One must invoke the power in ritual speech, and if the occasion is public, with ritual songs (*juywa*, *tinya*). Speech is more confidential, pragmatic, and persuasive, while songs are more stereotyped, artful, celebratory, and public. Speech, the confidential medium, is answered with an oracle. Sacrifice is the gift given as goodwill or payment (*voluntad*, *pago*) for the benison. The ritual regimen that leads and regulates actual labor in the supra-household sphere is a schedule of movements by the authorities to the economic sites where tokens are placed, powers invoked, and sacrifices given.

Within this general scheme, the logistics of planting, harvesting, and storing/redistributing the common crop form one of three concurrent

cycles (the others being herding and irrigation). The agricultural cycle is distinctive for its female symbolism. The planting segment of the cycle (October) involved the invocation and feeding of the *chakra* (i.e., soil plus plants) as a sacred bride, Mama Raywana, 'Mother of Food.' Her fresh plants then became the tokens for the second segment, which is still practiced. It is the closed, nocturnal New Year ritual, following the main 'town meeting' at the public hall. At this time the outgoing officers hand off the governance of the commons to the incoming ones by jointly inspecting and installing in Kaha Wayi consecrated crop tokens (*raywan*). The invocations of and sacrifices for the precinct itself and for the rain-owning mountains are still practiced on this occasion. In the full older order, five or six months later, at harvesttime, the authorities led the villagers to the mature fields and then back to Pasa Qulqa for measurement, deposit, and partial redistribution of the crop. This episode involved the dedication of tokens in the form of *pirwa*, distinctive tubers taken as amulets of the stored (seed, reserve) crop. They were installed in Pasa Qulqa amid invocations that figured her as a female divinity, whose 'breast' would feed the village through the year. A major sacrifice, apparently including flesh, was given Pasa Qulqa at this time.

Considered as a symbolic drama, the Pasa Qulqa round seems to be a figuration of economy as female domesticity from nubile to motherly state, and finally into authoritative old age as the agricultural year wanes. (Long-stored wrinkly potatoes eaten toward the end of the cycle are called *chakwas*, 'female elder.') If the common-field agricultural economy figured as the female economy, what was the male complement? The common-herd pastoral economy is the likely answer. Kaha Wayi, the locale from which both sectors were directed, housed tokens from both. Indeed the interior of Kaha Wayi could be interpreted as a reunion of the tokens responsible for the varied sectors of the common livelihood. The symbolic control effected upon their progress by their rites within Kaha Wayi went together with practical management of their growth from the same locale.

While Rapaz's integrated ritual and political-economic management of a crop seems to have prehispanic, even pre-Inka, antecedents, ethnographic analogy requires nuance. Inka deposits were located on the slopes immediately outside settlements, not in their center as in Rapaz and Tupicocha. And Inka deposits were architecturally different, consisting of numerous freestanding cells (D'Altroy 2002: 281) whose design hardly resembles Pasa Qulqa. Although Pasa Qulqa is sometimes called *tambo*, 'way station,' it does not architecturally resemble any of the archaeologically known storehouses at Inka way

stations or *tampu* (Hyslop 1984: 289–292). Evidently some major changes, probably during colonial times, overhauled storage design. But in functional terms, continuity is not out of the question. A storage institution for intracommunal use would parallel rather than contradict the Inka model. Whether it pre- or postdated the latter, we cannot yet say.

As for the integration of ceremonial with economic work to form an axis of governance, the most striking thing about the Rapaz case is its degree of centralization. Most of the particular ritual modules and verbal genres noted here have counterparts in other Andean places. What is exceptional is to find them articulated in a central place with a building of their own. Kaha Wayi is the only functioning Andean temple of which the authors are aware.

The high centralization of Rapaz leads one to think that over some historical trajectory this village was able either to preserve or reconstruct templelike forms of worship. These include not only rituals proper but a ritually framed system of control over collectively held production and assets. The study of these practices may open an interesting view of postInka Andean authority in its Andean functions, literally above and beyond the colonial institutions through which we ordinarily know them.

Notes

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CRAFT ACTIVITY AND ADMINISTRATIVE DEVICES AT TEOTIHUACAN, CENTRAL MEXICO

Linda R. Manzanilla

Introduction¹

The subject of this book involves the evolutionary implications of production, storage, and the administrative devices designed to keep track of raw materials, products, and people. One of the main questions is if storage is a phenomenon involving different scales and modes depending on the type of strategy practiced by leaders of a society: exclusionary or corporate (*sensu* Blanton et al. 1996; Rothman, [Chapter 1](#), this volume). I explore the case of an exceptional corporate-oriented society where central authorities probably did not control people and institutions through the central storage of staples. Residents conducted such staple storage in households and neighborhoods, nobles or intermediate elites controlling the latter. Control by central authorities and local nobles was vested in the storage, movement, and distribution of sumptuary goods and products and by the recruitment and use of a multiethnic labor force, mostly for craft production (Manzanilla 2015, 2012b).

Teotihuacan, a vast urban development in Central Mexico during the first six centuries AD, poses an intellectual challenge in this respect, as a result of its multiethnic character, its corporate structure, and the lack of written sources that could shed light on its organization.

I have been interested in two issues concerning this city: the first is the problem of centralized storage (the detection of archaeological data supporting this phenomenon); the second is the recognition of the administrative devices used to control the commodities stored, the raw materials and goods moved, and the labor employed. As for the first, I have proposed a methodological framework to assess storage (Manzanilla 1987, 1988, 2012a), in which the main issues are the type of good stored, the storage facilities, the social context surrounding storage, how the goods flowed, and the frequency of the storage use.

The first issue is to assess the type of products stored: foodstuffs and medicinal plants for household consumption, future agricultural

cycles, exchange, institutions like the palace (tribute), the army, and the temple; as well as raw materials and finished objects for household use, exchange, the palace, and the temple.

Foodstuffs and medicinal plants for household consumption may be either solids, such as cereals, leguminous plants, chenopods, oily seeds, breads, and so on, or liquids, such as water and other beverages (*pulque*) stored in *pithoi* and amphorae, as well as in *cuexcomates* and *trojes* (outdoor granaries), storehouses, and tronco-conical pits (Manzanilla 2012a).

Storage for future agricultural cycles involved the seeds needed for such tasks, and had to be kept in outdoor storage facilities such as *cuexcomates* (wattle-and-daub globular-shaped facilities) and *trojes* (outdoor wooden constructions), as well as sacks in indoor spaces.

Storerooms in marketplaces required a wide variety of resources and finished objects, as well as those given as tribute to the palace or delivered to the temple as offerings.

In empires such as that of the Inka, there were specialized storage facilities for the army, called *tambos*, usually placed along the roads, to house potatoes and maize (Covey, Quave, and Covey, [Chapter 7](#), this volume).

The second issue would be how things are stored. This issue involves the type of facility used for storerooms incorporated into buildings, as seen in tripartite Uruk temples and Mesopotamian palaces (Rothman and Fiandra, [Chapter 2](#), this volume), or in the Xochicalco acropolis (Garza-Tarazona et al., [Chapter 10](#), this volume); *trojes* or square-shaped wooden facilities, as are depicted in sixteenth-century historical sources on Central Mexico (see Rojas, [Chapter 13](#), this volume); *cuexcomates* or wattle-and-daub vessel-shaped facilities, seen in Epiclassic-period Cacaxtla, Tlaxcala, and still prevalent in modern villages of Central Mexico; and tronco-conical pits, typical of Formative Oaxaca and the Basin of Mexico; amphorae and *pithoi*.

The third issue is the scale of the storage phenomenon. It may be related to individuals or households (associated to houses and apartment compounds) in sectors and intermediate units, such as neighborhood centers; of an institutional character in temples, palaces, or fortresses; or of a communal character placed in the center of settlements, as seen in Umm Dabaghiyah and Hassuna villages in sixth-millennium-BC Mesopotamia (see Rothman and Fiandra, [Chapter 2](#), this volume).

The fourth issue would involve frequency of storage use and their ability to face contingencies and catastrophes or for banquets and

feasting.

The fifth issue is related to the economic sphere, such as the political economy, the elite economy, the domestic economy: direct consumption on the household level, consumption in reproduction (for domestic animals), for redistribution, for tribute, for barter, or for market exchange.

With respect to the second problem stated above—the administrative devices to control stored commodities, goods that move, and labor involved in craft production and other activities—in the absence of written documents, such as sixteenth-century codices (e.g., the *Matricula de Tributos*), I try to describe a possible token system involved in the control of labor in neighborhood centers, and the rationing system for the workers for Classic Teotihuacan in Central Mexico (Manzanilla 2011b, 2012c).

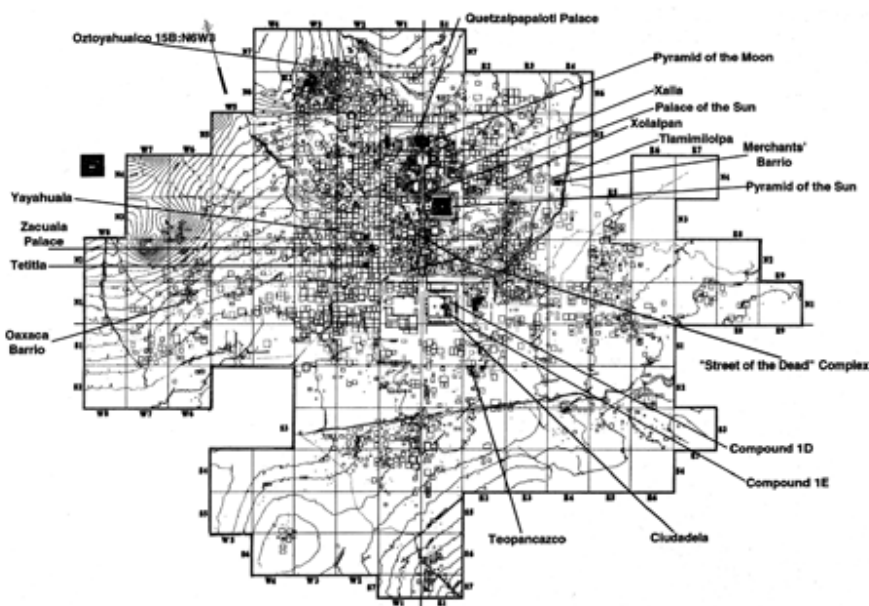


Figure 9.1 René Millon's map of Teotihuacan with important compounds mentioned (redrawn from Millon 1973).

Teotihuacan

The huge multiethnic metropolis of Teotihuacan in Classic period Central Mexico is one of the largest preindustrial urban developments of ancient times. A twenty-square-kilometer orthogonal city (Millon 1973) that housed around 125,000 people of different origins ([Figure](#)

9.1) (Manzanilla 2015), with practically no written texts to shed light on its organization and functioning, and with a corporate and multiethnic character, this city presents an intellectual challenge for archaeologists, because it is an exception more than a rule in Classic Mesoamerica (Manzanilla 1997, 2007, 2011a).

I propose that this impressive urban center had rings of craft production sectors (Figure 9.2): an outer one with foreign neighborhoods (the Oaxaca Barrio, the Merchants' Barrio, the Michoacán compound, and so on), and an inner one with multiethnic neighborhoods that might have been headed by intermediate elites (see Elson and Covey 2006)—there were nobles heading the neighborhoods as opposed to the central, ruling elite—that harnessed foreign labor for highly specialized crafts and that may have competed for the provisioning of sumptuary goods (Manzanilla 2006, 2009a, 2012d, 2015).

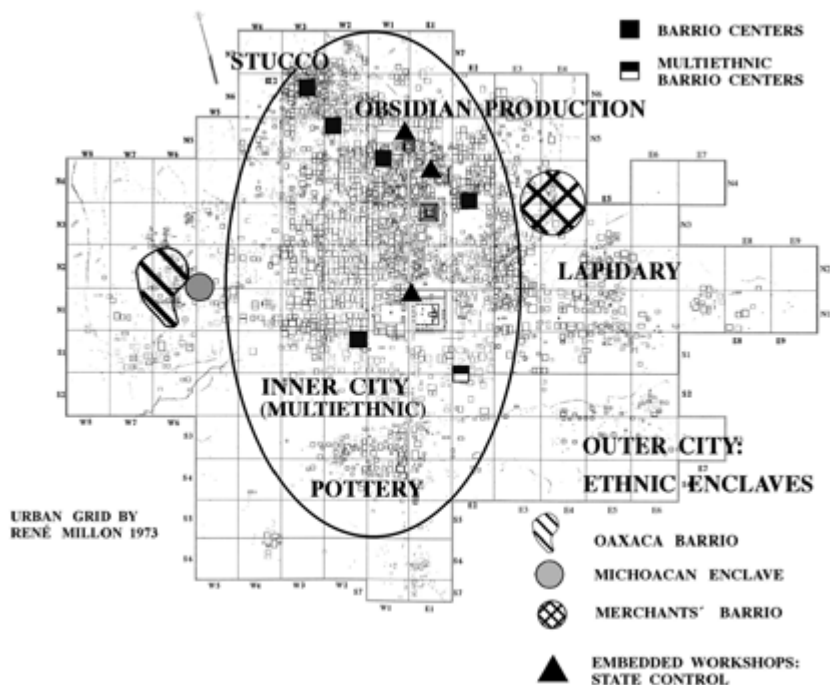


Figure 9.2 Craft production sectors in the city and multiethnic neighborhoods (drawn by Linda R. Manzanilla and Rubén Gómez-Jaimes).

In this complex scenario I see two types of organizations: a corporate strategy (Blanton et al. 1996) in the domestic domain of Teotihuacan, where corporate groups lived in multifamily apartment

compounds (Manzanilla 1993, 1996) and possibly served as corulers of the city (Manzanilla 2008, 2011a, 2009a, 2002), and an exclusionary strategy dominating the neighborhood centers (Manzanilla 2015).

I discuss the problems I see in detecting centralized storage in this metropolis. To recognize storage facilities in the archaeological record of Teotihuacan, my collaborators and I have used chemical analyses of stucco floors, archaeobotanical studies (particularly botanical macrofossils and pollen analysis) to assess what is stored, and the formal analysis of storage vessels (Manzanilla 2012a).



Figure 9.3 San Martín Orange amphora found in a storeroom at

Frangipane and Manzanilla's excavations at Late and Terminal Formative sites (ca. 400–80 BC), such as Cuanalan (Manzanilla 1985) in the Valley of Teotihuacan, uncovered a village of five-by-five-meter huts set around open courtyards. These early households had external domestic tronco-conical pits where maize cobs were kept for household consumption.

When the classic orthogonal metropolis came into being circa AD 200, there is evidence of domestic and neighborhood-scale storage, but there are still no data with respect to centralized institutional storage to date. No clear storehouses have been found in the structures bordering the Street of the Dead, the main north-south axis of the city, where administrative, ritual, and palatial structures related to the ruling elite are concentrated.

In Xolalpan times (ca. AD 350–550), San Martín Orange Ware amphorae (Figure 9.3) have been found at the household level in domestic storerooms attached to kitchens in multifamily apartment compounds, such as Oztoyahualco 15B:N6W3, where these amphorae stand together with flowers from medicinal plants, such as *Casimiroa edulis* (see Manzanilla 1993, 1996; Manzanilla and Barba 1990). Large, globular, polished dark brown vessels have been found in alignments of kitchens-storerooms bordering neighborhood centers, such as Teopanazgo (Manzanilla 2012c), but this is storage at a modest scale. These facilities may have fed the workers of the neighborhood centers.

Armillas cites rooms with several large vessels aligned along walls in Zacuala, which may suggest the existence of storerooms (Rojas 1991: 211), and he also referred to later post-Teotihuacan Mazapa storage in underground spaces in Las Palmas, where large vessels were kept (Rojas 1991: 202). Thus the question is whether the Teotihuacanos used the quarry tunnels under the city (originally excavated to procure volcanic scoria and tuff to build the settlement [Manzanilla 2009b; Manzanilla, López, and Freter 1996]) to store foodstuffs (Manzanilla 2012a).

Foreign amphorae, such as those made of Granular Ware from Morelos-Guerrero, may have included resins, wax, and honey brought to Teotihuacan, as recorded in later sixteenth-century tributary documents.

The nonexistence of large-scale storage facilities at Teotihuacan, particularly related to palatial structures, such as Xalla (Manzanilla 2008), the Quetzalpapálotl Palace (Acosta 1964), the 1D Compound in the Ciudadela (Jarquín-Pacheco and Martínez-Vargas 1982), and the

Western Plaza in the Street of the Dead Complex (Morelos G. 1993) might imply the following scenarios:

- Centralized storage if present in the Classic Period may have been installed inside the underground spaces, such as the quarry tunnels under the city (Manzanilla 2009b; Manzanilla, López, and Freter 1996), for example, La Gruta Restaurant, outside which Armillas reported seeing a large quantity of broken amphorae, disturbed by post-Teotihuacan occupations.

- Alternatively, there might not have been a central institution that concentrated staples and stored it on a large scale, but storage may be found on a modest level in neighborhood centers and residential compounds. This may have been a characteristic of corporate societies, where power and control were shared by different social groups, and particularly in the Teotihuacan case, neighborhood centers and their intermediate elites seem to be the most dynamic (Manzanilla 2015).

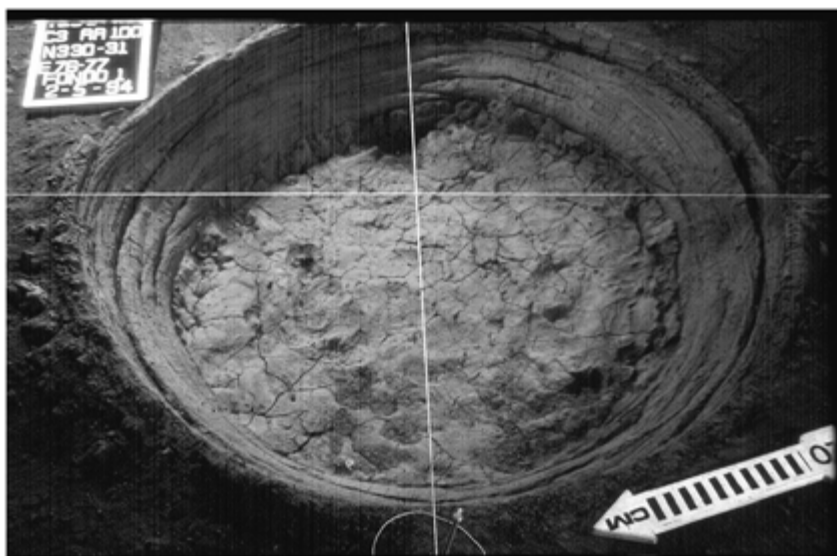


Figure 9.4 The bottom of a storage bin found in the chamber 3 of the Varillas Tunnel to the east of the Pyramid of the Sun (photo by Linda R. Manzanilla).

During the Epiclassic and Early Postclassic (Figure 9.4), I have found storage facilities (bin bottoms) inside the quarry tunnels extensively excavated to the east of the Sun Pyramid (Manzanilla 2009b) that may have housed cheno-ams for future agricultural cycles and ritual use (Manzanilla, López, and Freter 1996; Manzanilla and McClung 1997), based on comparative data from sixteenth-century ethnohistorical documents. Even though we do not have large-scale storage at Teotihuacan, we have to explore another issue where

administration is essential: the control of multiethnic labor in craft production sectors (Manzanilla 2011b).

The Teopancazco Neighborhood Center in the Southeastern Periphery

The Teopancazco compound was first excavated at the end of the nineteenth century, when Leopoldo Batres was summoned when important mural paintings were found in a potter's house-lot. In this site to the south of the Ciudadela, I developed an interdisciplinary project of extensive excavations from 1997 to 2005 (Manzanilla 2012c, 2015) to unveil a greater than 2,650-square-meter neighborhood center that showed considerable differences with respect to multifamily apartment compounds. During the 1980s I extensively excavated an apartment compound at Oztoyahualco 15B:N6W3 (Manzanilla 1993, 1996), which revealed the apartments of three families, each with a kitchen, a storeroom, dormitories, porticoes, ritual courtyards, and service patios. Neighborhood centers have a different disposition of functional sectors, as we will see further on, and few persons dwell in them.



Figure 9.5 The functional sectors of Teopancazco (redrawn by Linda R. Manzanilla, Rubén Gómez-Jaimes, and César Fernández).

In La Ventilla Barrio in southwestern Teotihuacan, different functional sectors are located in separate compounds: a ritual sector (a three-temple plaza), an administrative one (the Glyphs Patio), and a craft production sector for lapidary craftsmen (Gómez-Chávez 2000). The functional sectors at the Teopancazco neighborhood center in southeastern Teotihuacan (Manzanilla 2006, 2009a, 2012c) (Figure 9.5) are integrated into a single compound and involve a ritual area with a huge plaza, altar, and temples; an alignment of kitchens and storerooms in the northern periphery to feed the workers of the neighborhood center; military quarters in the southwestern area; a possible administrative sector in the south; a residential sector for the elite house that heads the neighborhood to the north; medical facilities that house a series of babies who died in childbirth to the northeast; and a garment-making sector where foreign craftsmen, identified on the basis of strontium and stable isotope analysis, were

making the intermediate elite's attire and headdresses (Manzanilla 2006, 2009a, 2012c, 2015; Manzanilla et al. 2011).

Different types of seals found in my excavations at Teopancazco raise the possibility that they may have served as administrative devices (stamp seals) (see Manzanilla 2011b), as well as *pintaderas* or large rectangular seals for printing designs on cloth, and other curved seals perhaps for body paint. In ancient Mesopotamia, evidence of administration has been detected in the form of clay sealings from large vessels, seals, sealed envelopes (*bullae*), tablets, and so on (Rothman and Fiandra, [Chapter 2](#), this volume), which were common when the first urban developments controlled the different items stored in state institutions. Denise Schmandt-Besserat (1992) has called our attention to Mesopotamian tokens, whose shapes are reproduced as signs on the earliest clay tablets. These small roundels, cones, and other forms have been found since the beginnings of sedentary life in Mesopotamia and are related to the redistribution and exchange of different types of goods.

In my excavations at Teopancazco ([Figure 9.6](#)), I have found similar objects that have been mistakenly identified as 'game pieces' Nevertheless, the large number of them, particularly pottery roundels (more than 550 pieces), may have been related more to labor and food rations than to goods or games.

With the three-dimensional situation of these objects of different forms, sizes, and raw materials, as well as their fractions (particularly whole circles, halves, quarters, thirds), I would venture to suggest that these roundels are depicting *tortilla* rations, that is, round maize flatbread (and perhaps other food), for different categories of people working in the neighborhood center. The equivalence between the roundels and *tortilla* representations is evident in the theater-type censer I found at Oztotyahualco 15B:N6W3 ([Figure 9.7](#)) (Manzanilla 1993; Manzanilla and Carreón 1991), where maize cobs, *Cucurbita* fruits and flowers, cotton, *tamales*, and *tortillas* are represented as falling from the hands of an individual wearing attributes of the butterfly god.

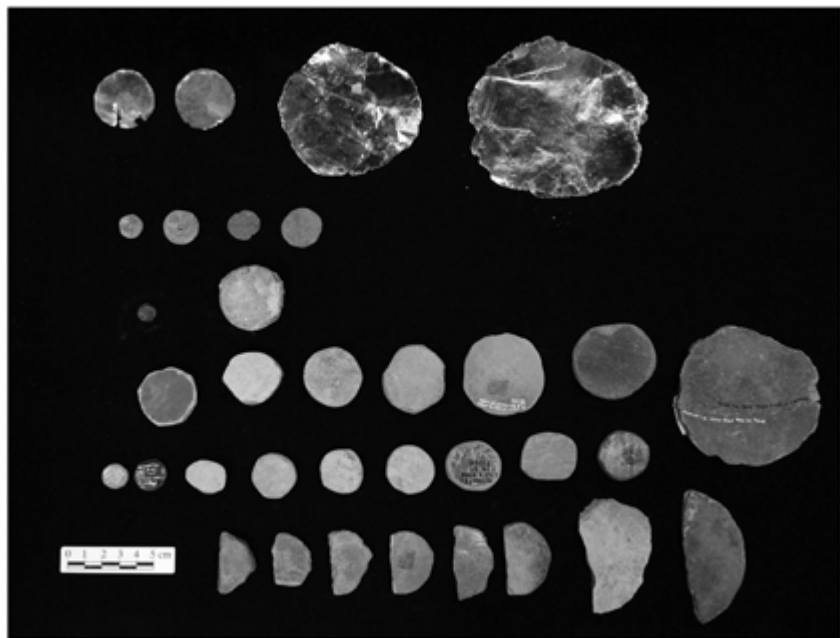


Figure 9.6 Roundels from Teopancazco in mica, slate, pigments, and pottery (photo by Linda R. Manzanilla and Rafael Reyes).

Different raw materials and standardized sizes were used to make the roundels at Teopancazco: pottery (approximately 550 pieces), mica, slate, pigments, and some examples of shell circles (see [Figure 9.6](#)).

The distribution of clay roundels in Teopancazco ([Figure 9.8](#)) suggests clustering in both temple sectors and ritual courtyards, as well as in the garment makers' shop, where different categories of workers may have been concentrated. Large roundels coexist with a greater number of medium-size and small ones, suggesting hierarchies, teams or *cuadrilla*-like organizations (for *cuadrillas* in the sixteenth century, see Rojas-Rabiela 2011) for craft production, ritual involvement, and other tasks. Most of the roundels are grouped in the middle-size range.

The different sizes of pottery roundels (see [Figure 9.8](#)) are matched by mica roundels, a softer mineral brought from Oaxaca in southern Mexico and controlled by the Teotihuacan state when the mineral arrived to the city. The mica roundels have only been found in the main burials at the site (Rosales and Manzanilla 2011) and may have been attached to the attire of these individuals. These mica roundels may signal elite individuals in the neighborhood centers.



Figure 9.7 Theater-type censer found in my excavations at Ozttoyahualco 15B:N6W3 (Manzanilla 1993; Manzanilla and Carrión 1991).

Some researchers have suggested other uses for roundels: polishers or *patolli* game pieces, and those with notches, as net sinkers (which have also been found at Teopancazco and are clearly different). Nevertheless, the high numbers of clay roundels at Teopancazco (more than five hundred pieces) may suggest a series of related functions: the material reference to individuals who worked at the neighborhood center who may have used their roundels to receive *tortilla* rations in exchange for their work. These craftsmen may have also used the roundels as models to cut mica discs and/or as polishers when needed, but their main use was in exchange for *tortillas* in the alignment of kitchens-storerooms in the northern periphery of the neighborhood center. Most of the worker population buried at Teopancazco may have eaten mainly *tortillas* and maize-fed animals, as seen in the stable isotope study published by Morales-Puente et al. (2012). Other token forms are found in profusion at Teopancazco: bicones, cones, phalanges, spheres, and so on. Clay spheres have often been interpreted as projectiles for blow-tubes. We have found 251 small clay spheres at Teopancazco, and the profusion of bird remains may account for their high number.

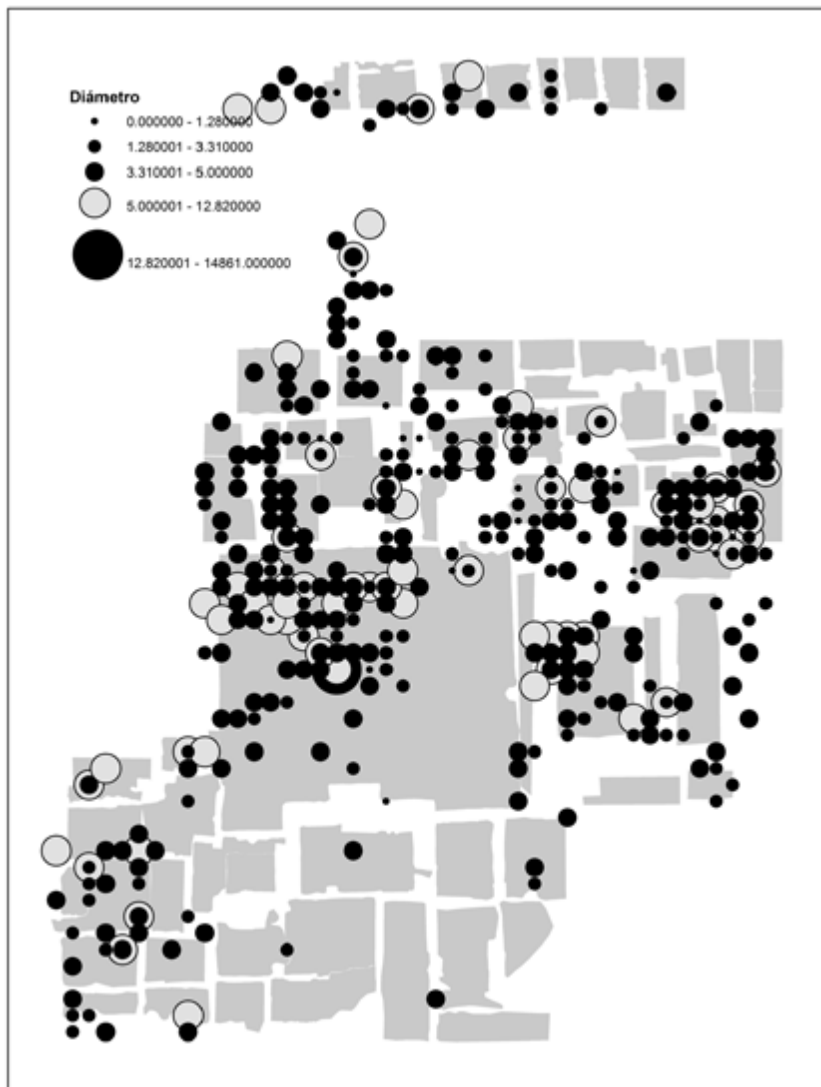


Figure 9.8 Spatial distribution of pottery roundels of different diameters in Teopancazco (map by Gerardo Jiménez and Linda R. Manzanilla).

Sites in the Teotihuacan Corridor: Xalasco in Tlaxcala

To better understand the possible function of these types of tokens it is worth turning to ally sites in the Teotihuacan corridor to the Gulf Coast, a corridor used by the Teopancazco caravans. Xalasco is one of these sites located near Huamantla in Tlaxcala (Manzanilla and Bautista 2009; Manzanilla, Aguayo, and Hernández 2011; García-Cook 1981). Stone slab structures and feline stone decoration called our

attention to the site as a possible way station for Teotihuacan caravans from Teopancazco (Teotihuacan) to Veracruz.

Our recent small-scale excavations at Xalasco have revealed roundels in many more parts than the Teopancazco group: we have eighths, sixths, fifths, quarters, thirds, halves and complete roundels, but quarters are the dominant parts; of the 203 roundels found, only 11.33 percent are complete, 16.25 percent are halves, and most, that is, 47.29 percent, are quarters. In contrast, at Teopancazco, a neighborhood center of Teotihuacan with strong ties to the Gulf Coast, of the 530 roundels, 81.88 percent are complete, and only 12.21 percent are halves.

Three alternative interpretations of the existence of roundel fractions are as follows:

1. *Tortilla* rations for men, women, and children, represented by complete, halves, and quarters
2. *Tortilla* rations for Teotihuacanos, Tlaxcaltecs, and Veracruzanos
3. *Tortilla* rations for full-time, part-time, and occasional craftsmen

My guess is that the second may be the most likely, owing to the predominance of their quarters in Xalasco, Tlaxcala, and complete roundels in Teopancazco, Teotihuacan; this implies that the local people in each of these centers are represented by the most abundant fraction. In the analysis of the roundels found in the garment-making sector at the Teopancazco neighborhood center, where foreign garment craftsmen were manufacturing elite attire, perhaps aided by people from the corridor, we also see some half roundels.

Much remains to be assessed with regard to these different objects. One thing that is emerging from this study is the fact that administrative devices in Mesopotamia involve the control of foodstuffs, raw materials, and goods, both the receipt and distribution from central institutions to bureaucrats, armies, dependent farmers, craftspeople, and others attached to the royal household. Those in Mesoamerica may have been related more to account for the provisioning of persons, especially craftspeople by neighborhood nobles.

In sum, we have roundels in pottery, slate, mica, and shell, and the medium-size diameter is also found in pigment tablets. Different sizes are represented: the small, medium-size, and large ones. There are also complete and fractions (particularly halves and quarters). My

interpretation is that they are tokens to be exchanged for *tortilla* rations for different categories of individuals working in the neighborhood center, and I also suggest that the raw material from which they are made implies the status of the person and perhaps the function. The size may be related to the labor organization inside the team or *cuadrilla* for each task, with supervisors or overseers. The fractions may be related to gender, to ethnic background, or to their complete versus partial involvement with the tasks: garment making, basket making, rope and net manufacture, hide working, and so on.

The multiethnic population of Teopancazco consisted of three groups: local people, persons coming from the corridor en route to Veracruz, and migrants from afar (Manzanilla 2012b, 2015), taking into consideration trace elements, stable isotopes, and strontium isotopes. Strontium isotope ratios are related to the geology of a region, and thus, to the soil, the plants that grow there, and the animals that eat plants and other animals; all incorporate this particular ratio of strontium isotopes in their bones and teeth. The teeth seal this ratio in their structure at an early age, and a comparison of a tooth with a long bone (that reveals the ratio at the time of death) can reveal migratory status. Oxygen isotopes may also be used to assess migratory status, because they are related to the water consumed at an early age and the time of death, because the specific ratios of oxygen isotopes are related to altitude.

Exchange of Foreign Raw Materials and Products along the Corridor

The movement of people along the corridor on the route to Veracruz was part of a larger economic exchange network that fed into the Teotihuacan economy. During thirteen field seasons of extensive excavations at Teopancazco, Teotihuacan, we found different raw materials and products from other regions of Mesoamerica, particularly the Gulf Coast of Mexico and the corridor linking the two regions. Fourteen varieties of fish that perhaps arrived smoked and/or salted to Teopancazco from the coastal lagoons of Veracruz (Rodríguez-Galicia 2010), along with crabs, crocodile, a heron from the Gulf Coast, cotton cloth, marine mollusks, and labor (specialized craftsmen), as well as other products (pottery, travertine, Thin Orange Ware, pigments, and so on), were brought by the caravans (Manzanilla 2011b, 2015).

At Teopancazco, Velázquez-Castro, Zúñiga-Arellano, and Valentín-Maldonado (2010) identified the greatest diversity of marine shells yet found in Teotihuacan: thirty-two families of gastropods and thirteen bivalves, twenty-eight of which come from the Pacific, thirty from the

Gulf Coast, and four from the Caribbean.

On the route or corridor of Teotihuacan sites (Calpulalpan, Xalasco, and so on) that passes through Tlaxcala and heads to the Gulf Coast (García-Cook 1981), another route joined it from the south from the region of Ixcaquixtla (in Puebla) to Xalasco (in Tlaxcala) (Manzanilla 2011b) (Figure 9.9). This route provided the Teotihuacan caravans with travertine, Thin Orange Ware, perhaps marble and lime, and may have had an extension to Morelos-Guerrero.

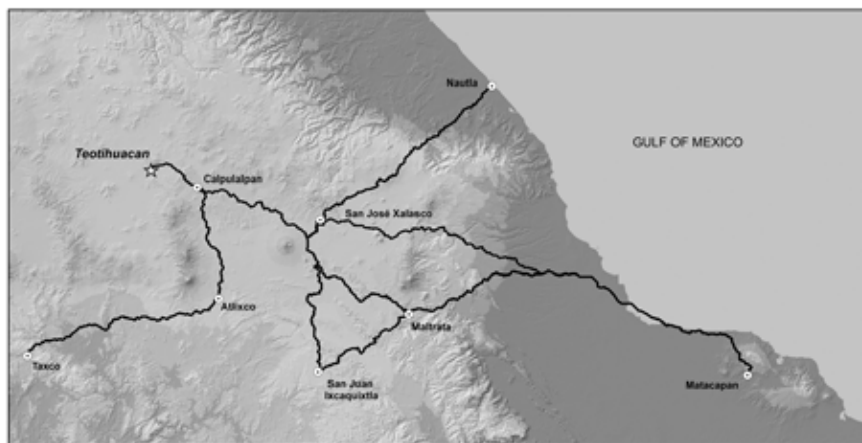


Figure 9.9 Proposed corridor route toward the Gulf Coast (map by Gerardo Jiménez and Linda R. Manzanilla).

The multiethnic site of Xalasco, Tlaxcala, near Huamantla, was located directly north of Ixcaquixtla, Puebla, in a straight line, and may have functioned as a port of trade for the caravans coming from Teotihuacan and heading to Veracruz, as well as for those coming from Puebla. The region of Ocotelulco in Tlaxcala supplied negative decorated vessels to Teopancazco.

Granular Ware, some of the slate and greenstone, as well as Pacific shells, came from Guerrero, and it is interesting the some of that pigments and cosmetics detected in the pottery miniatures from Teopancazco, such as jarosite, galena, and cinnabar (Doménech-Carbó et al. 2012; Vázquez de Ágredos-Pascual, Manzanilla-Naim, and Vidal-Lorenzo 2012), are found in the Taxco region of Guerrero (Salas 1980), together with specular hematite, which was also used profusely at Teotihuacan. At Teopancazco, cinnabar is not only employed as an orange pigment in polychrome wares (Martínez-García et al. 2012), but was also found as a corporal paint in miniatures and also as part of the funerary treatment of the decapitated males deposited in a termination ritual around AD 350 (Manzanilla 2009a, 2012c).

Final Remarks

Teotihuacan is a fascinating laboratory to understand multiethnic interaction, an exceptional case owing to its corporate organization, and one of the most outstanding examples of urbanism where office, status, and ethnicity are intertwined in a complex civilization that lasted five centuries.

The presence of counters may be related to the multiethnic environment in which craft production and the movement of sumptuary goods took place, as a material means of organizing labor in teams, giving each worker *tortilla* rations, and highlighting those individuals that had leading roles in the neighborhood with mica, slate, and shell insignia. Perhaps in complex multiethnic and corporate societies such as Teotihuacan the centralized storage of staples did not exist, and instead may have been supplanted by smaller intermediate social units, each with the autonomy to organize their economy, their caravans to regions for sumptuary good provisioning, and their 'house' societies.

Thus, the Teotihuacan state seems to have formed a pact between elite groups and ethnic organizations. The ruling council that may have governed this city (Manzanilla 2008) may have responded to this situation: the need to build consensus decisions in a scenario where contending interests could otherwise have torn apart this inherently divided organization.

Notes

1. Interdisciplinary projects such as the 'Ancient City of Teotihuacan. First Phases of Urban Development' (1985–88) and 'Teotihuacan: Elite and Rulership' (1997–2005), projects I headed, involve the participation of many experts and students. I thank all of them for their support and feedback. I also thank Alejandro Bautista with whom I excavated Xalasco in Tlaxcala, a multiethnic site where caravans from Teotihuacan stopped. My special thanks to Mitchell Rothman for his useful comments. These projects were funded by the Institute for Anthropological Research of the National Autonomous University of Mexico, DGAPA-UNAM, and the National Council of Science and Technology of Mexico. The federal permit for the archaeological excavations was granted by the National Institute of Anthropology and History of Mexico.

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STORAGE AT XOCHICALCO, MORELOS, MEXICO

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and Beatriz Palavicini-Beltrán*

Introduction

The archaeological site of Xochicalco is located in the west-central portion of the state of Morelos, Mexico. This city is recognized as one of the most prominent early states of the Epiclassic period (AD 600/700–900/1000) (Jiménez-Moreno 1959). The cities of this period are distinguished, among other aspects, for their defensive settlement pattern on hilltops. The founders of Xochicalco chose a hill 120 meters above the surrounding terrain, making the most of the topography in order to establish hierarchical levels, which reflect the spatial order of the city (Alvarado and Garza 2010). Consequently, the highest part of the hill was restricted to political and administrative activities, rituals, and the residences of high officials (Figure 10.1).

The power under which the city was founded demonstrates a state-level society where nearby cities and villages were controlled through military subjugation to secure the goods and labor needed to maintain the central organism. This same power required the design and planning for the storage and safekeeping of sumptuary goods, raw materials and finished articles, both local and foreign, in order to control and administer the interests of the authoritarian state.

Storage

Storing is an economic activity based on the assumption of scarcity due to natural risks and/or surplus production (Hirth 2012: 14–15). Depending on the social hierarchy, storage has different goals: on the domestic level, it can secure the supply of staples in case of a natural disaster or other kind of disruption in order to ensure the sustenance of their members over a period of time (D’Altroy and Earle 1985: 190; Hayden 2009: 599; Alvarado et al. 2012: 82; Hirth 2012: 15; see Covey, Quale, and Covey, Chapter 7; and Chapter 1, this volume). In complex societies, it was intended to guarantee the economic stability of the political systems and the proper functioning for the survival of those who do not produce food and for the integration of political

units in a market system (D'Altroy and Earle 1985: 191–93, 196; Alvarado et al. 2012; Hirth 2012: 15).



Figure 10.1 Main Plaza and Acropolis on the hilltop of Xochicalco. Credit: Adalberto Ríos.

The main objective of storage in Xochicalco was to establish centralized control of products and goods of a tributary system (Manzanilla 1983: 5; 1985: 103). Because of the oppression carried out by Xochicalco, the city received all the necessary labor for its establishment, maintenance, and expansion as a large part of the tribute received was in the form of labor. However, given the environmental conditions around the city where the optimal land for cultivation is located “within a 5 km radius” (Hirth 2000: 153) and the requirements of the institutions, the city depended on tribute food. Therefore, to satisfy the demand for both a permanent and temporary supply, it was necessary to concentrate the products in specific areas.

Similarly, the centralization of raw materials, imported goods, and other items of restricted use was necessary for their control, work, and distribution within the sphere of power and beyond the borders of Xochicalco’s domain, facing perhaps an institutional kind of storage (Hirth 2012: 20–22; Smith 2012: 211) in which the palace had a fundamental place in the political and economic relations within the city.

The Palace

During the Epiclassic period in Central Mexico, there was an emergence of urban settlements with different levels of fortification which exhibit certain architectural complexes that can be identified as

“palaces,” where activities of administrative and political character are evident. In this case, we refer to the concept of palace used by Manzanilla (1985, 2001) as an architectural complex that involves the material representation of political power.

To address to the concept of a palace as an institution, we refer to it as a monumental building inserted in an urban context, yet isolated from the common people. The monumentality of these buildings is the first indicator of control over labor and construction materials. On the other hand, the strategic location of the palace, its isolation, its restricted circulation, and limited access within the urban plan also suggest a privileged position of the occupants within the chain of decision making in the city (Manzanilla 1985; Manzanilla, López, and Fash 2005; Alvarado et al. 2012: 82; Alvarado 2015: 184).

The architectural complexity of a palace permitted the development of the institution’s diverse activities. In the first place, it hosted people dedicated to the administration of goods (which vary greatly according to the case), but in relation to this core activity we find that palaces were places where political decisions were made, officials lived and religious and other types of ceremonies were conducted.

The most prominent part of the hill of Xochicalco was allocated to one of the most representative and important buildings of the city: the Acropolis (Alvarado 2015) (Figure 10.1 and Figure 10.2). Located west of the *Plaza Principal*, its monumental aspect is manifested in its layout, made up of ten buildings—one of them, the AC8, with two stories—interconnected by corridors and stairways, with patios and spacious rooms (Alvarado, in press) (Figure 10.3).

The excavations in the Acropolis have revealed the presence of items related exclusively to the elite: stone sculptures, masks, pendants, beads and earrings made of greenstone or seashell, figurines of greenstone, censers, and Tlaloc vases. It is important to mention that many of these objects were found with marks of deliberate destruction, and some of them were part of other fragments found in Sector B (located on a lower-level terrace on the northern side of the Acropolis) (González et al. 1993–94: 61–72; Alvarado et al. 2012: 87; Alvarado 2015: 184).

The distribution of rooms, their different configurations, and the diversity of the archaeological materials found inside and outside the Acropolis, have allowed us to identify many of its features, like the storage areas for food and raw materials, workshops, areas for food preparation, residential quarters, and reception rooms, leading us to consider this archaeological building complex to be the palace of Xochicalco.

The Acropolis represented the wealth and power Xochicalco achieved during the Epiclassic period through the accumulation, control, production, and probable redistribution of luxury goods.

We now present the different kinds of staples and goods under the control of the palace institution at Xochicalco and other locations where they were stored.



Figure 10.2 Map of Xochicalco referring the Acropolis, Sector J, and Bastions.

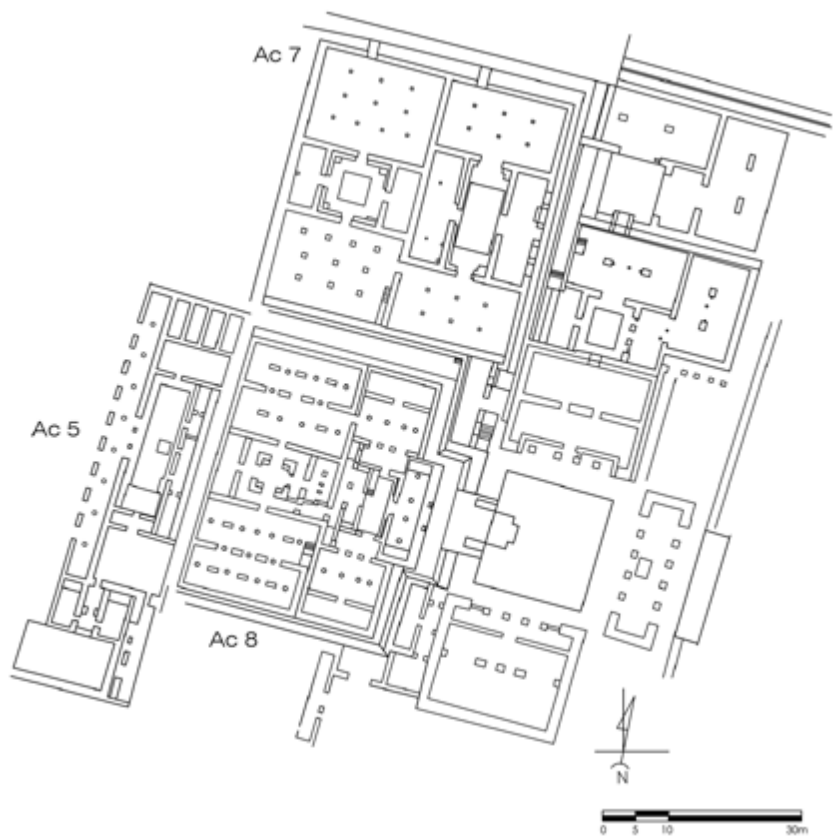


Figure 10.3 Acropolis layout, pointing out the structures mentioned in the text.

Storage at Xochicalco

Food

Since the systematic explorations of the central part of Xochicalco began in 1992, there were four areas that, because of their size, location, and associated archaeological remains, were considered grain storerooms or *graneros* (González et al. 1993–94; Alvarado et al. 2012; Alvarado 2015: 190–191).

Inside the Acropolis, to the west, we find structure Ac5 (see Figure 10.3). In contrast to the rest of the structures in the group, Ac5 has a different floor plan with a rectangular layout and access from the west. In addition, the rooms of the structure are smaller and have low benches; they are more private when compared to other areas within the same architectural complex. Coupled with this data, the analysis

of archaeological materials found in this structure reveals that its primary role was of a residential/domestic character, highlighting the presence of six *tinajas* or large amphorae taller than one meter (Garza and González 2006; Alvarado et al. 2012: 86), bowls, braziers, and incense burners.



Figure 10.4 The *graneros* (storerooms) inside Structure Ac5. Credit: Adalberto Ríos.

However, one of the architectural elements that attract more attention to Ac5 was the *graneros* (Figure 10.4). There are four rectangular areas of 2 meters by 5.50 meters, located at the northern end of the building, inside a large room where three *tinajas*, a *cazuela* (basin), and several bowls were found.

The *graneros* were built in a later architectural stage after the original building plan (Alvarado 2015: 190–191). The architects erected three transverse walls supported by the wall that originally enclosed the room to the north. To the south, they built another wall to ceiling height, leaving only an entrance at the eastern part of the *granero*. Access was 1.5 meters above the room's floor, suggesting that they would have needed to use a ladder of a perishable material to reach it. On the other hand, being the only entrance to the four *graneros*, the cross walls that divide them have a cavity between them and the south wall, creating a kind of interior elevated passageway or crawlway to go from one *granero* to another (Figure 10.5). The volume of each of these areas is 41.80 cubic meters, a total of 167.20 cubic

meters for all four.

These *graneros* are very similar to the ones described for the Grill Building from the site of Ziyadeh, Syria (Hole 1999: 269–270, fig. 5), and in some other sites in the Near East (Badra 2015: 112; Manzanilla 2012: 78). They also seem to be akin to the ones identified in Pachacamac, a site on the coast of Peru (Eeckhout 2012: 215, fig. 1). Until now, we had not found data about similar structures at any other site within Mesoamerica.

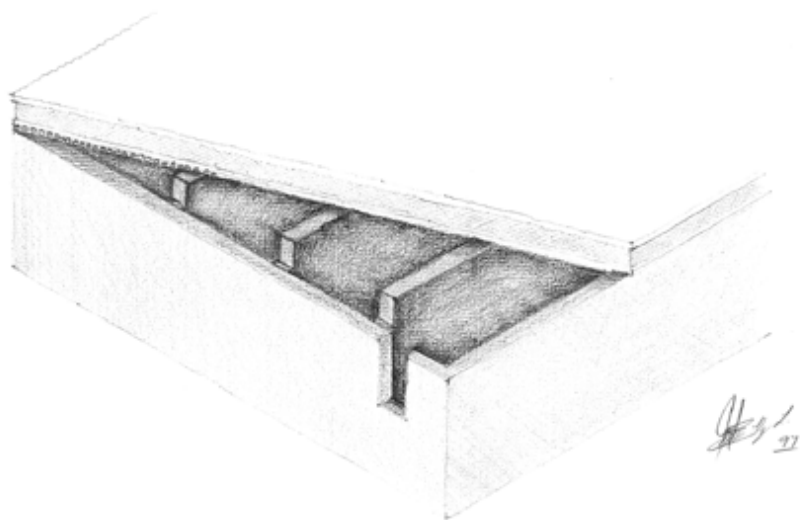


Figure 10.5 Reconstructed view of the graneros.

After the excavation of these four areas in Xochicalco the *graneros* were identified as places for grain storage because of their size and composition. Despite having collected samples for archaeobotanical analysis, the results were inconclusive because of the particularly poor conditions for the conservation of this kind of botanical remains in Xochicalco (Fernando Sánchez, personal communication, 2011). However, during the 2006 field season, Luis Barba and his team took floor samples from the *graneros* as well as from other areas within the Acropolis. In each *granero*, twelve samples were taken, totaling forty-eight. The results of these analyses are shown in [Table 10.1](#), where the presence of carbonate (CO_3) indicates the quality of the floors; the presence of pH implicates possible hydrogen, which would indicate remains of ashes; the presence of protein residues is associated, depending on the type of space analyzed, with places for preparation and consumption of food, or the bloodshed of animals occurred; the fatty acids indicate food preparation areas, resins, or wood storage;

the phosphates (PO_4^{3-}) suggest activities that left behind substances rich in phosphorus; and carbohydrates are related to starches and sugars (Barba, Ortiz, and Terreros 2006).

Table 10.1 Maximums, Minimums, and Averages Result from Floor Analysis

	Maximum					
	CO_3	pH	Protein residues	Fatty acids	PO_4^{3-}	Carbohydrates
G1	6	9.35	8	0	3	3
G2	5	9.34	9	0	4	3
G3	6	9.38	9	0	5	3
G4	6	9.35	8.5	0	4	1
	Minimum					
	CO_3	pH	Protein residues	Fatty acids	PO_4^{3-}	Carbohydrates
G1	3	9.1	7.5	0	2	0
G2	3	9.2	7.5	0	2	0
G3	3	9.14	7.5	0	1	1
G4	3	9.03	7	0	2	0
	Average					
	CO_3	pH	Protein residues	Fatty acids	PO_4^{3-}	Carbohydrates
G1	4.78	9.25	7.67	0	2.67	1.44
G2	4.42	9.25	8.00	0	3.00	1.75
G3	4.67	9.25	7.96	0	2.58	1.67
G4	4.83	9.18	7.79	0	2.58	0.83

The overall results of these analyses show a generally high pH, suggesting that there was a fire on the floor of the *graneros*, as it was not an area for food preparation. The fire could be the one that destroyed the majority of the city's structures at the end of its existence (González et al., in press), although there is a possibility that a fire could have been lit in order to get rid of the *graneros* insects, rodents, and their remains. On the other hand, high levels of protein

residues, phosphates, and carbohydrates indicate the storage of some organic product, although they could not determine which.

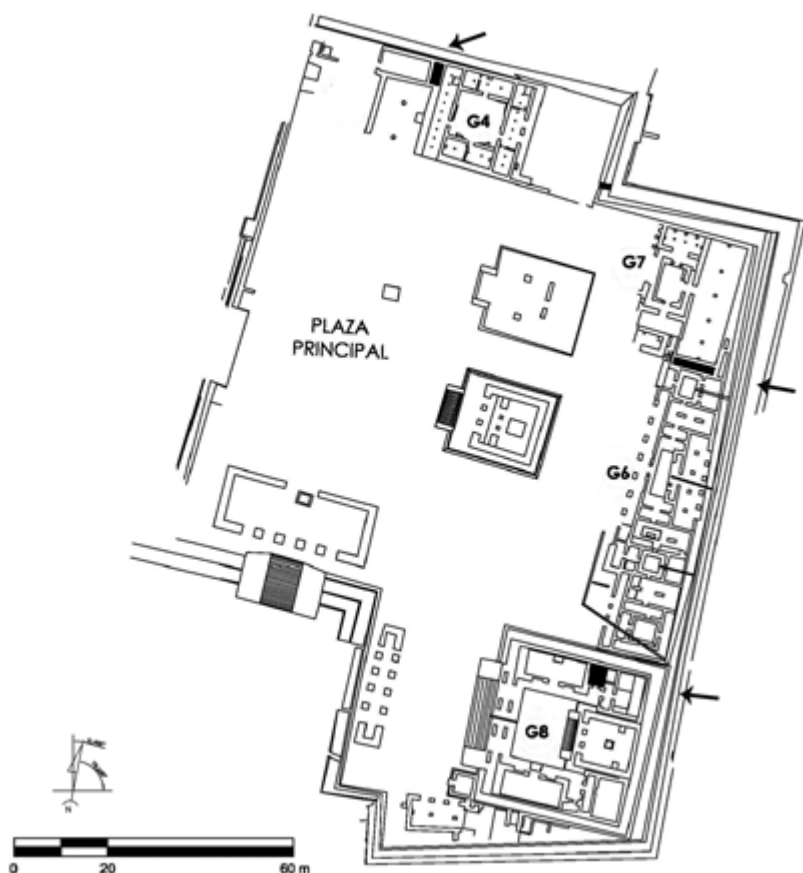


Figure 10.6 The Plaza Principal (Main Plaza) with the location of listed buildings and storage areas.

The grains stored inside the *graneros* in the Acropolis could have been used for food preparation to serve the governmental, military, and religious institutions, as well as the labor groups in charge of the maintenance of the upper part of the city, and feasting.

The archaeological record found west of the Acropolis in Sector J, seven terraces below, could support this idea. The bones of slaughtered animals and human beings, pottery, cobs, and many other objects were found in a layer of earth and ashes, possibly the remains of a ritual ceremony.

There are three other possible *graneros* located within the structures of the *Plaza Principal*: G4–G11; G6, G7, and G8; or *Pirámide de las*

Estelas (Table 10.2; Figure 10.6).

Structure G4 consisted of several rooms surrounding a patio. Access was from the east, appearing to be an area that tended to be separated from the activities carried out in the plaza. In fact, the structure was associated with a recessed stairway that seems to have been a domestic entrance from a lower terrace. The entire structure was built out of adobe, apparently serving as a food preparation area. Among the findings from this building and the adjacent G11 are four *tinajas*, jars (*cántaros*), pots, and bowls, among other objects (González et al. 1993–94).

Table 10.2 Dimensions of the Different Graneros Found in Xochicalco

	Length (m)	Width (m)	Volume (m3)
Ac5 (4)	5.5	2.5	41.80(167.2)
G4–G11	4.8	1.80	29.7
G6–G7	9	1.5	51.3
G8	2.6	2.1	20.8

Between structures G4 and G11 is a 1.80-by-4.8-meter *granero* with a capacity of 32.83 cubic meters. This is a completely enclosed room, with no access in any of its four walls. There is a stairway inside the room, which suggests that access was only from the top.

A third area of grain storage is found between structures G6 and G7. These buildings are located at the north of the *Pirámide de las Estelas*, flanking the *Plaza Principal* on its eastern side (see Figure 10.6).

G6 was a rectangular building with four patios and various rooms around them. G7 was a large structure that was burned and destroyed to build the *Pirámide Gemela*. The excavations revealed three rooms around a patio and two small stairways: one at the south outside between the two buildings and the other inside the patio (González et al. 1993–94). The data suggest that access to the structure could have been through the roof, entering through the patio.

Located between the G6 and G7 structures, there is a rectangular area with no access, and a capacity of 51.3 cubic meters. This possible *granero*, like those found in the Acropolis, was built sometime after the original floor plan of G7. A section of the longest room was separated off by a wall, to create a storage area with an entry from the top.

This also occurred in the G8 building’s storage area, where later architectural modifications led to the construction of the smallest *granero* yet found (20.8 cubic meters) (see Figure 10.6). The findings in this building, along with its architectural design, have led us to propose that it was probably the housing for senior members of the Xochicalco social hierarchy.

Xochicalco controlled a series of local and foreign sumptuary goods that were exchanged and distributed exclusively by the elite. Such was the case of obsidian from Michoacán and Hidalgo, pottery objects and blue pigment from the Mayan area, jade from the Motagua region, Guatemala, turquoise from Zacatecas and the southwestern United States, and shells from the Pacific and the Gulf of Mexico, among others.

An example of this control is reflected in the local greenstone objects that abound in Xochicalco. With this stone, artisans created figurines, beads, pendants, earrings, nose rings, and other types of adornments (Garza 1993–94). Within the city, we found a total of 1,017 anthropomorphic figurines and 1,968 greenstone beads; the great majority were found in the dumps of Sector B (Elements 1 and 77; [Figure 10.7](#)), where a total of 581 figurines and 287 beads were located. The other great concentration was found inside structure G6, with a total of 195 figurines and 901 beads.

At this point, we would like to highlight the relevance of Elements 1 and 77. They show not only the situation that prevailed within the city circa AD 1100 (Gonzalez et al., in press) but also the role played by the Acropolis as a centralizing institution. Both dumps have led us to note that the archaeological materials were removed and thrown from the Acropolis to Sector B ([Figure 10.7](#)), as a result of the rebellion that led to Xochicalco's tragic end. Among these elements, projectile points, bifaces, knives, eccentrics, punches, masks, scrapers, bowls, vases, pots, flutes, pendants, masks, earrings, nose rings, incense burners, handled censers, molds, architectural elements, human and animal bones, and many more items were found.

Getting back to the greenstone, it is important to note that we have not found the necessary evidence to affirm that the items made from such material were completed within the city. Regardless of whether the products were made in Xochicalco, it seems to be a fact that the centralized power controlled their distribution inside and outside of the city. Even though the raw material can be found nearby in the Taxco shale deposits and at the Tembembe River, the importance of the finished object was considered to be high, given their scarce presence in other parts of Xochicalco.

It is important to mention the greenstone beads found at the southern entrance of the city during the 1984–86 fieldwork (see [Figure 10.2](#)). This access was flanked by two structures that have been called *Bastiones* (Garza 1993; Alvarado and Garza 2010). In the East

Bastion, 461 greenstone beads and fifty-six figurines were found. These findings have allowed us to consider this space as a checkpoint; it is possible that to gain the right of entry it was necessary to leave something in exchange.

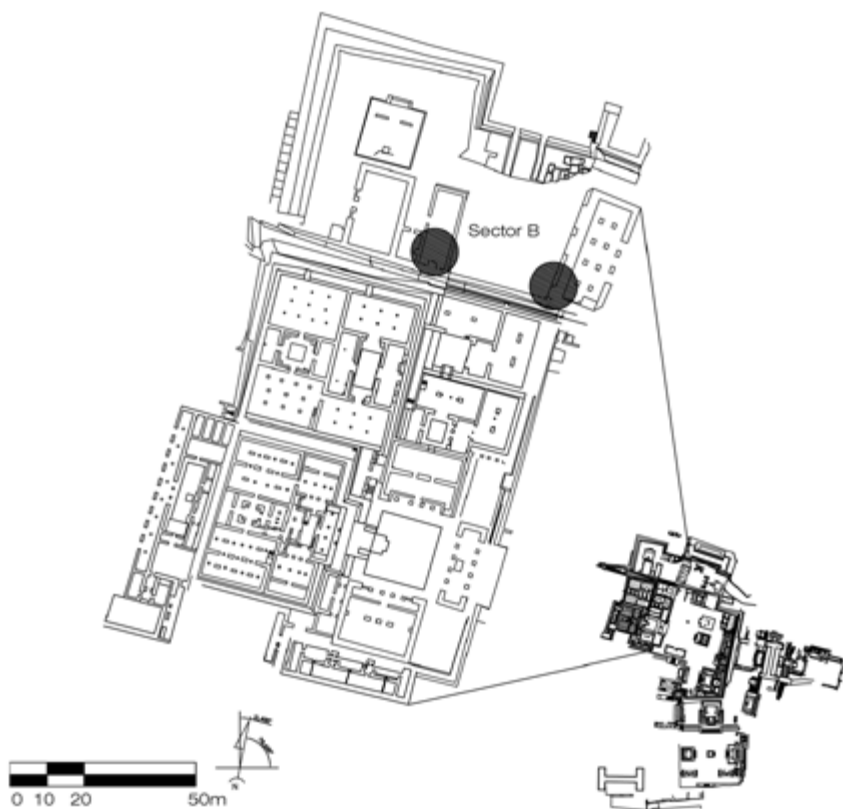


Figure 10.7 Elements 1 and 77 located in Sector B, north of the Acropolis.

Turning again to the Acropolis, with emphasis on its multiple functions, the size of the rooms, especially the area found in the Ac7 and Ac8 structures, is important (see [Figure 10.3](#)). These structures contained the largest and most spacious rooms in Xochicalco, with areas ranging from 72 square meters to 256 square meters. Given these dimensions, we have proposed that these areas were used for the storage of prestige goods and raw materials, as well as for workshops where full-time specialized craftsmen controlled by the state produced all of the objects.

The study of shells has provided interesting data that support this hypothesis. The results obtained in the analysis made by Melgar (2007, 2009) reveal that 95 percent of the collection was found in

Elements 1 and 77 (see [Figure 10.7](#)), while the remaining 5 percent was found in the halls of the Acropolis. The collection includes raw material, objects made of shells in the process of being manufactured, and finished items.

During the fieldwork in the *Pirámide de las Serpientes Emplumadas* by César Sáenz (1963) in 1962–63, a burial offering consisting of several unprocessed shells covered with cinnabar was found. Decades later when examining the same building, Norberto González found at the foot of the stairs a later burial site with an offering containing about 191 shell objects (González et al., 1993–94).

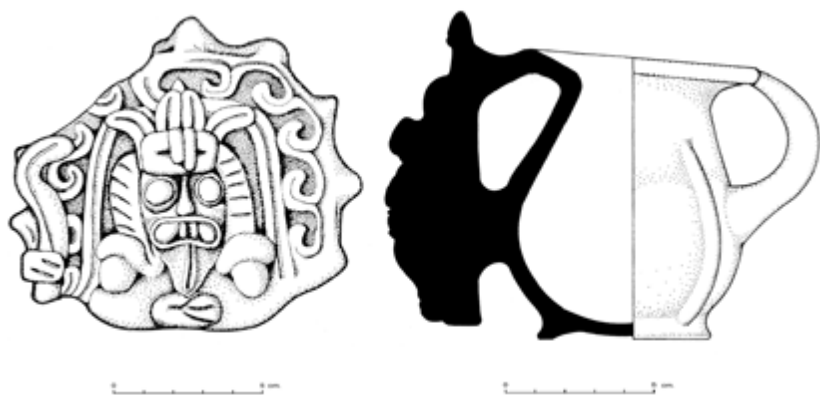


Figure 10.8 Tlaloc vessel.

With the analyses of the material recovered from the Acropolis, from Elements 1 and 77 and from the objects offered up at the foot of the *Pirámide de las Serpientes Emplumadas*, Melgar (2007, 2009) concluded that all the manufacturing process of shell objects took place in the highest part of the city, at the workshops located in the spacious rooms of the Acropolis.

Besides the control over greenstone and shell, we consider that some of the most exclusive ceramics could have been manufactured within the city. The discovery of recurrent molds and their positives in some areas suggests that there was some control of very special pottery that could only be produced with the consent of the elite. An example of this is the large number of ceramic molded and *appliquéd* plates that represent the Thunder God (González et al. 1993–94). These so-called Tlaloc vessels ([Figure 10.8](#)) were mostly concentrated in an architectural space near the *Gran Pirámide*, a temple associated with the worship of that same god. We assume that political and religious authorities would have controlled these molds and the distribution of their positives within Xochicalco.

Finally, we suggest the possibility that perishable materials could have been stored inside the Acropolis. We have considered that the great halls were used for the storage of raw materials, such as cotton, wood, feathers, and animal skins, among others. The presence of cotton crops in the state of Morelos before the Spanish intervention is known (Sanders and Price 1968: 192), so it would not be unusual for Xochicalco to have had control over this precious resource for Mesoamerican societies.

Final Considerations

The need for staples for the maintenance of the non-producing groups that administered the state apparatus and its formal function by controlling the manufacture and circulation of sumptuary goods required specific areas for storage. In early states, it is possible to identify these particular areas inside or very close to buildings related to civic and private ceremonies.

The Acropolis in Xochicalco included areas for food storage and workshops. Its location, its architectural arrangements, the archaeological evidence found within the spacious rooms as well as its restricted access, reveal the role the building played as a palace by definition. The presence of this kind of structure is an indicator of a socially stratified society, where the group in charge of controlling staples and goods get their tribute from the subjugated provinces, accumulating, storing, and redistributing products under their control (Manzanilla 1985: 92; 2001: 103; Alvarado 2015).

Although a distribution network to determine how much land was controlled by Xochicalco has not been detected, the evidence from the upper part of the city allows us to suggest that the food stored in the *graneros* was used for the subsistence of priests, rulers, and full-time specialists working within the Acropolis workshops. The *tinajas* found in the rooms related to the *graneros* in both the Acropolis and structures G4 and G11 in the *Plaza Principal* were used for the preparation of large quantities of food.

The discovery of the dumps on the western slope of the Acropolis, and the terraces below, where bowls, braziers, censers, handled censers, animal bones, obsidian knives and blades, masks, and many other materials were found in a layer of earth and ashes, suggested to us that this was possibly a dump of ritual celebration, with the use of some of the products stored within the palace.

Despite our conclusions that the ruling class in Xochicalco survived by tribute and labor from the subject villages, we assume that there

could be another kind of economic interaction to complement the survival and empowerment of Xochicalco that is still to be identified.

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STORAGE, TRIBUTE, AND POLITICAL ADMINISTRATION AMONG THE LOWLAND MAYA

Michael P. Smyth

Introduction

Storage, the setting aside of food and goods for future need and investment, was of critical importance to ancient Maya political economies. Because the growing season was not year-round in the tropical Maya lowlands, limited by rainfall and periodic but unpredictable drought cycles, the Maya state had to rely on the storage of foodstuffs to finance the economics of political administration. The way the Maya state organized storage is closely related to Maya political structure, especially during the Late Classic period (AD 600–900). This chapter distinguishes differences in storage strategies, how and where goods were stored, and how stored goods were administered, as a way to reconstruct political structure among the lowland Maya.

Three major topics concerning Maya storage and the economy are explored: (1) subsistence and surplus, (2) specialization and trade, and (3) the degree of political centralization. I argue that storage relates to production, consumption, distribution, and exchange in various ways at Maya centers. The focus here is on the Maya city of Tikal, but it is assumed that there was considerable variability across the lowland Maya world. An important implication is that storage can be used to monitor economic processes and their variation across time and space. Moreover, differences in storage strategies—how and where goods were stored and how stored goods were administered—are key questions for reconstructing ancient economies. Identifying both storage places and storage organization is essential for understanding the past Maya political economy.

Tikal

Tikal was one of the largest Classic period centers in the southern Maya lowlands, with an urban core of sixteen square kilometers and an estimated population of around sixty thousand (Culbert et al. 1990;

Figure 11.1). Most attention has been directed to Tikal's monumental edifices, hieroglyphic writing, and elite culture; comparatively little work has attempted reconstructing Tikal's political economy and its material foundations. With the exception of studies of water management (Scarborough and Gallopín 1991; Dunning et al. 2002), and underground cisterns (*chultunes*; Puleston 1971), there has been little work to understand the role and significance of goods storage at Tikal or other Maya centers.

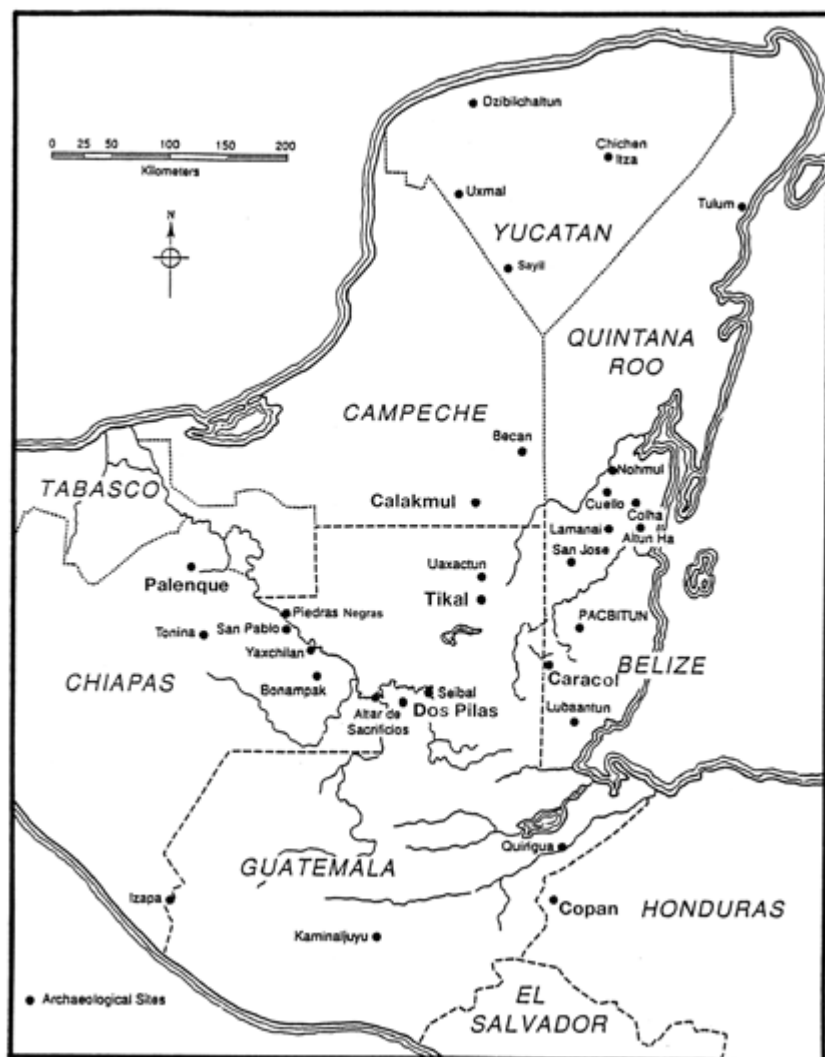


Figure 11.1 Map of the greater Maya area showing the location of the center of Tikal and other sites mentioned in the text.

Subsistence reconstruction at Tikal has demonstrated that the Maya

were engaged in a complex array of cultivation strategies, including various forms of wetland agriculture, as early as the Preclassic period (Harrison and Turner 1978; Harrison 1993; Pohl 1985; Turner and Harrison 1983). Challenges to the role of wetland systems during the Classic period (Pohl 1990; Pohl, Bloom, and Pope 1990; Pohl and Dahlin 1989), however, have not altered settlement and ecological studies that have discredited the traditional swidden-based hypothesis. Clearly, the agricultural landscape around Tikal was extraordinarily complex (see Scarborough and Gallopín 1991; Dunning et al. 1999), with permanent wetland cultivation systems combined with upland swidden fields and, surely, annual rainfall agriculture. With this elaborate agricultural technology, the Maya were clearly capable of producing the material surplus necessary for supporting complex political institutions and sustaining large, sedentary populations at Tikal for more than one thousand years. Given the many threats to farming, Tikal could not have been maintained without storage technology.

Tikal was located along a strategic trade route linking tropical lowlands to highland regions. It remains unclear, however, how this trade network functioned, what kinds of goods moved in and out of Tikal, or whether the city was primarily a consumer or a producer of goods for local consumption and export. If there was a large, central marketplace at downtown Tikal (Coe 1988; C. Jones 1991; Thompson 1966), unambiguous evidence is lacking, as is an understanding of the internal economic organization of the city. One must not confuse the presence of a marketplace with a market-based economy. Market capitalism and the commoditization of labor, hallmarks of market-based economies, were an unlikely part of the ancient Maya economy at Tikal (see McAnany 1992; cf. Dahlin et al. 2007). If the fundamental material power base of Maya elites rested on the control of land, labor, and the material by-products thereof, then *the storage of surplus goods generated and the political-economic strategies employed to support the state should be closely related*. In other words, storage strategies should reflect the political power (control) structures.

Most Maya researchers see craft specialization as being organized at the household scale; it is unclear whether specialization was predominantly kin-based or attached to elite households (Becker 1973; Blanton et al. 1981; Freidel 1981; Rice 1987). Evidence from other Maya centers, such as Sayil and Colha (Shafer and Hester 1991; Hester and Shafer 1994; Smyth and Dore 1994; Smyth et al. 1995), indicates that there was large-scale ceramic making and even entire communities specializing in lithic tool manufacture, implying the possibility of an economic ranking within social classes (also see

Chase and Chase 1992). These studies suggest that the Maya had complex, multilevel social stratification and not just a rigid two-class society (elite and commoners), though evidence for a true middle class remains doubtful (McAnany 1995). At Tikal, how and where utilitarian goods were produced, distributed, and exchanged to tens of thousands of consumers are not known (Fry 1974; Moholy-Nagy 1976). A better understanding of storage systems and how they associate with craft production and marketplace exchange can reveal important aspects of the Maya economy.

Much recent attention has focused on Maya elite culture as Tikal, especially epigraphy (see Culbert 1991), but there is significantly less understanding of sociopolitical structures and the material foundations of elite power. Written inscriptions reveal little regarding the role of the lesser nobility, an administrative bureaucracy, and the commoner class. Important information of the lesser nobility, however, has been recently gleaned for the epigraphic record of Copan and elsewhere (see below). The most popular political model for the Maya is still the segmentary state: a decentralized political structure with regal-ritual centers serving as places of ceremony, elite affairs, and consumption but not major economic production and exchange (Ball and Taschek 1991; Demarest 1992; Fox 1977; Sanders and Webster 1988). A contrasting view sees the Maya as regional states and even as militaristic, tribute-based empires akin to the Aztec (Adams and Jones 1981; Adams 1991; Martin and Grube 1994, 1995). Obviously, a much wider range of information is needed to reconcile such diverse views of Maya political organization. The collection of more complete settlement data from different Maya centers, both large and small, is needed (King and Potter 1994; Smyth, Dore, and Dunning 1995). Also, a better understanding of storage organization can shed insights into the structure of the Maya political economy.

Storage Economy

Storage is fundamental for understanding past political-economic organization. Identifying storage systems in the archaeological record and in the Maya area, however, has not attracted adequate research attention among archaeologists (see Gotthilf 1982; Smyth 1990, 1991). Elsewhere I outlined (Smyth 1989: 98–99) a set of archaeological expectations of how storages systems should appear under diverse mechanisms for generating state surplus; *surplus* refers to material commodities produced not for immediate consumption but for future use and investment. The basic idea is that there are three generic kinds of preindustrial economies: labor service (corvée labor), tribute, and trade, with corresponding degrees of political

centralization reflected by investment in central/state, community, and domestic storage systems. Drawing on these expectations, this exercise attempts to posit necessary linkages among degrees of political centralization, methods of surplus generation, and storage systems in the Maya area (Table 11.1). In other words, the kinds of storage systems employed by a society should reflect important organizational aspects of the political economy.

Table 11.1 Hypothetical Relationships among Political Economies, Storage Systems, and Degrees of Political Centralization

TRADE/EXCHANGE	
Trade/Exchange	
Domestic	
	1. No substantial investment in facilities: short-term storage
	2. Low redundancy in form of storage
Community	
	1. Substantial features
	2. Bulking: diversity in form of storage
	3. Associated with local market
Central/State	
	1. Larger than community
	2. High diversity in form of storage
	3. Associated with marketplace and/or civic architecture
LABOR SERVICE	
Domestic	
	1. No substantial investment in facilities: short-term storage
	2. Redundancy in form of storage
Community	
	1. Large storage features(s)
	2. Bulking: low diversity in form of storage
	3. Associated with local/public architecture
TAXATION/TRIBUTE	
Domestic	
	1. Substantial storage feature(s)
	2. Redundancy in form of storage
Community	
	1. Large storage features(s)
	2. Bulking: low diversity in form of storage
	3. Associated with local/public architecture
Central/State	
	1. Very large and /or many substantial storage features
	2. Warehousing: moderate diversity in form of storage
	3. Associated with major civic/governmental architecture

Mesoamerican political-economic systems were dependent on storage but evidence for storage remains elusive (Smyth 1989, 1990). The reason for low visibility may be because storage was organized across different societal scales, such as at the household, community, and state levels. Although all state-level societies practice storage at

different scales, it is the degree of domestic storage to the political economy that may distinguish Mesoamerica from other early states where central storage was highly developed (e.g., the Andean highlands, dynastic Egypt, the Indus Valley, and Mesopotamia).

The political economies of the early states, for example, were organized around strongly autocratic personalities and bureaucratic institutions, with centralized power in the hands of relatively few individuals and/or within strong regulatory yet exclusive institutions. Among the highest levels of government, the distinction between personal wealth and state wealth was either ambiguous or did not exist. The power vested in the Egyptian pharaoh and Inka emperor is a good example of extreme autocratic rulership where the property of the state and the wealth of the sovereign were virtually inseparable (Conrad 1981; Murra 1982; Rowe 1946; Cyril 1986; Kemp 1989). Under these conditions, the political economy was materially sustained, on command, by relying heavily on the control of labor. Stated another way, labor service was the dominant tax for supporting the state. Tribute in goods, although collected, was not primary, and markets and trade were not central to the economy. Under labor service, state storage was practiced on a monumental scale, reflecting a high degree of centralized political control.

In contrast, Mesoamerica seems to have been less centralized politically, with power being shared among many competing factions. In Late Classic Copan, for instance, the community house or “Popal Na” of local lords played an important role in decisions of late Copan rulers (Sanders 1989; Fash, Andrews, and Manahan 2004). Among the Aztec, it is clear the king was not an autocratic ruler. The Aztec ruler shared power with the elected high counsel of esteemed men from the important cities and wards (including the rulers of the Triple Alliance) and was obliged to consult them on all matters affecting the empire (Carrasco 1971; Gibson 1971). Berdan (1977) has shown how important the tribute system was to the Aztec state and how it articulated with other labor and exchange systems; corvée labor was clearly a tax, but it is questionable whether it was the most important form of material provisioning to the state. Although the working of elite estates by tenant farmers was important to the maintenance of the nobility, tribute payments in the form of goods paid locally, regionally, and throughout the empire were fundamental, especially to the king. It is likely that tribute was also economically as important to the Classic Maya state as it was in Terminal and Postclassic Yucatan (Chamberlain 1951; see also Andrews 1983; Ardren et al. 2010).

Trade and Exchange

Long-distance trade and market exchange provided goods for distribution, wealth, and prestige for both elite and nonelites, but trade and exchange may not have contributed substantially to the state. Tikal and other large Maya states were not based on market economies, but that market exchange was obviously important for the distribution and importation of goods. If elite power was based on trade, then storage facilities should be concentrated at marketplace settings and—this depended on the kinds and amounts of different trade goods imported and exported—should exhibit evidence of the goods being stored and exchanged. This certainly seems to be the case for Late Postclassic Cozumel. Warehousing facilities (identified as raised nonhabitation platforms at the interior of the island at San Gervasio) appear to have been located next to marketplaces and elite residences where stored trade goods could be offloaded from large seagoing canoes (Freidel and Sabloff 1984). Market storage of this variety also would have served to protect trade goods from pirates and hurricane activity, so prominent in this area. Many argued that Tikal had a marketplace, but they could not identify the locations of major warehousing facilities, where trade goods were locally produced and exchanged. Marketplaces without warehouses suggest that local exchange was of far greater economic importance than long-distance trade where trade items circulated among the elite. In either case, the state could not have been sustained by taxing marketplaces, controlling market exchange, or engaging in long-distance trade. Here, storage systems, mechanisms for surplus generation, and power structures appear interrelated.

It is doubtful that long-distance trade generated significant state surplus at Tikal. Though it is difficult to assess the volume and movement of such trade goods as salt, honey, feathers, and slaves during the Classic period, there was a brisk trade in these items during the Postclassic (Andrews 1983; Roys 1943, 1957), and we know that obsidian and jadeite were important trade goods. Local exchange, however, could have contributed significantly to state institutions and to the prosperity of economic middle-level groups. While evidence for local exchange at Tikal is limited, data from the Maya centers of Sayil and Chunchucmil in the north suggest the presence of central marketplaces and large-scale craft specialization (Sabloff and Tourtellot 1991; Smyth and Dore 1994; Smyth et al. 1995; Tourtellot, Sabloff, and Carmean 1992; Tourtellot and Sabloff 1994; Dahlin et al. 2007). These data show that the Maya economy was organized in complex ways and that we need to learn more about the means of material provisioning, including storage.

What was the predominate method of surplus generation among the

Maya? If labor service was the primary means of material support for the state, why is there no clear evidence for large centralized storage facilities? The bulking of foodstuffs and goods at a centrally controlled location was a prominent feature of the labor-based taxation systems of the Inka, Mesopotamian, and Egyptian states. Large stores of food were needed to feed and supply workers who labored for state-sponsored construction projects, normally during off-agricultural periods (Mendelssohn 1974; Murra 1980). The building of Tikal's monuments obviously required enormous labor, and surely draft labor was employed. Why, then, is there not ample and clear evidence for central storage? One possible answer is that draft labor was important to monument construction but not necessarily to the material support of the state. Perhaps, local communities were required to supply both the laborers and their rations for periodic state-building projects in addition to their regular tribute payments, something alluded to in the ethnohistoric record of Yucatan (Chamberlain 1951). The lack of large-scale centralized storage suggests that labor service was not a primary factor in the material support of the Maya state and suggests a low degree of political centralization.

Tribute

Tribute refers to a tax on goods produced and are taxes paid to the state by turning over a portion of already produced goods. If tribute was given on a large scale and on a regular basis, I argue that one should see heavy investment in diverse storage systems at different societal scales, especially the domestic and community levels. Information on the pre-Conquest tribute system of the Maya of northern Yucatan indicates that foodstuffs (maize, beans, squash, chili peppers, and so on) were the main items given as tribute since at least the tenth century AD. Under these conditions, goods would be produced, stored, and distributed at dispersed locations throughout the urban center, such as at house compounds and at communal buildings in neighborhoods and city districts. If most storage was dispersed, then central storage should be found at palace and/or temple localities but at a reduced scale, perhaps not unlike the storage magazines alluded to by Spanish eyewitness accounts for the Aztec palace complexes at Tenochtitlan. While these facilities were puny by Inka standards, they were clearly not designed to support major economic redistribution but rather to sustain the ruler's extended household and his duties as head of state (Díaz de Castillo 1956: 211; Rojas 1987). This observation is apparent from the accounts of the three-year famine of "One Rabbit," when royal stores were opened to prevent Tenochtitlan from being depopulated; most of the stored food

seems to have come from outside the city (Durán 1964: 144–147; Hassig 1981). How applicable the Postclassic Aztec organization is to the Classic Maya is a matter of debate, although some level of comparison cannot be discounted.

Because studies of storage at Tikal have received little attention, a lack of evidence for central storage at Tikal does not necessarily mean it did not exist. Indeed, many studies of palace architecture imply that many small room compartments were for the storage of goods, especially durable goods. Other studies suggest that underground cisterns were major storage places. My observations and experiments suggest that this kind of storage must have been limited to nonperishable goods because the fluctuating temperature and humidity levels in stone rooms and underground chambers in tropical climates will produce an environment detrimental to food storage (see below). I and others have argued that most long-term food storage in the Maya lowlands must have taken place within impermanent structures and facilities, where the storage environment could be more securely regulated (see Gotthilf 1982; Hernández Xolocotzi 1949; Smyth 1989, 1990, 1991).

Without large central storage, labor service was unlikely to have been the basis of the Maya economy for the reasons given above. Of course, contributed labor was a factor in the support of many elites at the time of the conquest (Roys 1957). Of greater importance for the sixteenth-century Maya of Northern Yucatan, though, was the system of goods tribute collected from dependent centers, communities, and domestic units (Chamberlain 1951) for maintaining Maya state institutions. Indeed, tribute as a mode of surplus collection depended mainly on household and community production and storage. Once again, comparisons of Late Postclassic and Classic Maya are uncertain, although the lack of large-scale, centralized storage in both cases suggests a system of dispersed storage and less centralized political power structures. In addition, the breakthroughs in Maya epigraphy have clearly shown that militarism was indeed a salient feature of Classic Maya polities, especially Tikal and other large centers (Culbert 1991). These data suggest that the acquisition of tribute was a major state objective of conquest and territorial expansion among the Classic Maya (Hassig 1992: 75–80; Martin and Grube 1994, 1995).

Palace Storerooms

Classic Maya palace structures were foci of political and economic activities concerning the ruling elite class. At Tikal, for instance, the Central Acropolis just south of the Great Plaza, built over a period of

five centuries, consists of a series of internal courtyards surrounded by range-type buildings with various room and entryway configurations (Figure 11.2). Although the functions of palace rooms have been the subject of much speculation, whether any rooms were actually storerooms has not been seriously explored. Of course, storage identification depends, in part, on whether rooms could house tribute-related perishable foodstuffs over longterm periods greater than one year or beyond one agricultural harvest. The likelihood is low, however.

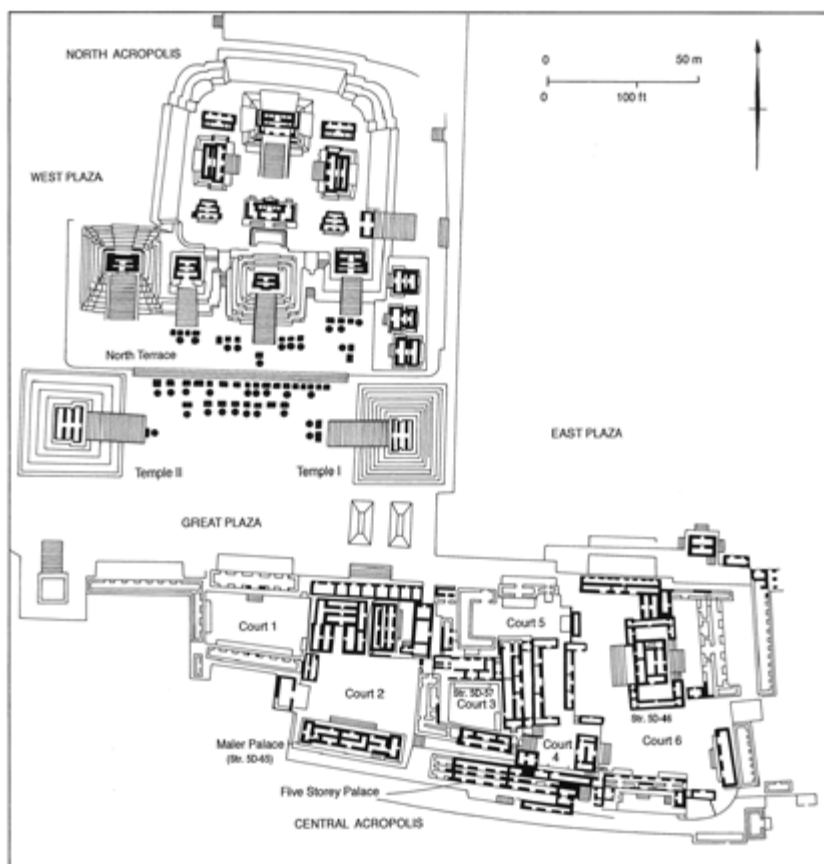


Figure 11.2 Map of the North Acropolis, and Great Plaza, and the Central Acropolis at Tikal showing the locations of the Palace Structures 5D-46, 5D-57, and 5D-65 (Maler Palace), associated courts, and possible storerooms for durable goods.

In the lowland tropics, the storage environment of stone-walled, stone-roofed rooms is not favorable to food storage even if staples, such as maize and beans, were thoroughly dried. The fluctuating high

temperature and high humidity levels in palace rooms, especially during the tropical rainy season, produces a poor storage environment. Successful maize storage is constrained by several variables, including moisture content, temperature, humidity, storage time, and the level of fungus present (Christensen and Kaufmann 1969; Johnson 1957; Nansen et al. 2004; Udoh, Cardwell, and Ikotun 2000). These factors are all interrelated to a process called “heating,” which raises the levels of humidity within stored maize, creating an atmosphere conducive to fungus growth and rapid deterioration in the form of rotting and spoilage.

The most effective means of combating fungus growth in grain in the absence of modern refrigeration is by drying (Estler 1979). The reduction of the moisture content of grain lowers relative humidity, inhibiting fungus growth (Milton and Jarrett 1969). The control of ambient temperature and humidity also reduces moisture content of grain.

The way maize is stored—whether on or off the ear—depends on storage time, storage space, and the kinds of facilities available. Some researchers contend that insect damage is less on maize left on the ear (Weatherwax 1954); others suggest that shelled maize dries better (Leonard 1976). Ear maize requires twice the storage space of shelled corn and is best stored in cribs that can provide good ventilation; shelled maize stores better in bins (Leonard 1976; Shove 1970). Either facility option would have been possible within Maya palace storerooms.

In warm climates, insulation, ventilation, and solar radiation are important in the design and placement of storage facilities (Ransom 1960). Insulation from high outside (or inside) temperature succeeds by constructing facilities (and rooms) out of solid, durable materials. To reduce solar radiation, exterior surfaces must be shaded from the sun while windows, doors, wall openings, and accessibility must be limited to minimize heat and entry of warm, moist air. Elevating facilities off the ground promotes adequate ventilation and protection from soil or floor moisture. Finally, ground-level storage facilities, such as those in rooms, should have watertight openings and floors to protect against flooding and moisture.

In November 1986, I conducted a storage experiment within one interior room of the first story at the Great Palace at Sayil in the Puuc region of northern Yucatan. The purpose was to determine if stone rooms with stone-vaulted roofs provide usable environments for long-term storage of maize. Room 35 on the east wing of the palace was chosen because it is structurally intact, has a large interior space (17.5 square meters), and contains a stone bench to elevate a storage facility

off the floor. A contiguous exterior room (34) with cord holders and wall sockets suggests that both rooms could be closed and sealed, probably with cloth curtains or heavy tapestries (Pollock 1980; figure 173; Sabloff and Tourtellot 1991).

Research among traditional Maya farmers shows that unhusked dry maize packed on the ear in tight vertical rows in open-sided wooden cribs (*trojes*) can preserve maize without significant spoilage for more than three years (Smyth 1991; [Figure 11.3](#)). Shelled maize stored in bins, in contrast, will not preserve beyond one year. It was also found that the use of powdered lime (calcium carbonate) when generously applied to stored maize helps to further dry ear maize and serves as a vermin repellent. At the Sayil Palace, a miniature version of a maize *troje* (fifty by fifty centimeters) commonly used by local farmers was constructed of wooden poles, packed with two rows of dried ear corn, saturated with lime, and then elevated above the stone bench of room 35. Subsequently, the storage facility was monitored periodically over the course of eight weeks to determine any changes in state of storage. What became apparent immediately was that the humidity of the room was consistently high (about 80 percent) though the temperature was reasonably low (about 25°C). High humidity is associated with the stonework of Maya buildings, which tend to “sweat” as a result of fluctuating hot daytime and cool nighttime temperatures. Also, poor air circulation is a factor in mold and fungus growth often seen on stone and stucco interior walls in standing Maya buildings, a condition detrimental to long-term food storage.



Figure 11.3 Photo of a traditional modern storage facility (*troje*) of the

packed ear maize form of storage from the Puuc region of northern Yucatan. Storage facilities like these are also found within storehouses.

Within six weeks, the maize began to show evidence of fungus growth, and later there were clear signs of rotting. Obviously, this stone room was not conducive to long-term maize storage. These results were consistent with information provided by local Maya farmers who had attempted, unsuccessfully, to store maize within the intact vaulted-stone rooms near the *milpa* fields at the Maya palace at Chunchuhub near Xculoc, Campeche. Today, buildings with perishable walls and roofs are used for as rooms for long-term maize storage because they provide a stable, regulatable environment. The ancient Maya must have stored maize and other foodstuffs over the long term in similar perishable structures.

The bulking of valuable durable goods in palace rooms (cotton cloth, exotic stone, fine-ware pottery, honey and wax, and so on) is another matter and must have been part of elite economic tribute and exchange activity. The storage requirements for such durable goods concern accessibility and security. Another factor impacting storage location is whether palace goods were personal possessions or property of the state, and the degree to which these were mutually exclusive. Such valuables should be near or within the elite residence, perhaps not unlike the treasure room uncovered by Spanish conquistadores as they occupied Axayacatl's Palace in the Aztec capital of Tenochtitlan in 1519 (Díaz de Castillo 1956).

Of the various palace structures at Tikal's Central Acropolis, the most secure storerooms for durable goods are interior locations with the few access points (see [Figure 11.2](#)). Rooms fitting these criteria are found in the center of Jaguar Paw's (Chak Tok Ich'aak, AD 360–378) Palace complex (Str. 5D-46), located on the east side of the Central Acropolis, especially the small lateral rooms on the north and south sides perpendicular to the west staircase. This Early Classic Maya ruler may have engaged in long-distance trade and even intermarriage with the powerful city of Teotihuacán (Martin and Grube 2000: 28). A decorated Palace complex (Str. 5D-57) believed to be the personal house and royal court of the Late Classic Maya ruler Jasaw Chan K'awil I (AD 682–734; Harrison 1999) is part of the main building north of Court 3. Here, there are a number of interior rooms on the east and west sides with single doorways and restricted access consistent with a secure storeroom for valuable goods. The so-called Mahler's Palace (Str. 5d-65) is believed to have been built by the twenty-ninth lord of Tikal, Yax Nuun Ahiin II (AD 768–794), who reigned at the beginning of the city's decline. His palace is a two-story

range structure south of Court 2 on the west side of the Central Acropolis and shows two rear rooms with single doorways that restrict access, one with a lateral chamber, adjacent to the deep Palace Reservoir.

If palace storerooms were closed and sealed in ways to identify the owner and the possessions contained within them, no such unambiguous evidence for seals, doors, or closures has ever been found. How access to storerooms was regulated by the Maya elite is also unknown, but some sort of record keeping associated with tribute collection, redistribution, and exchange activity was clearly necessary. Because the Classic Maya had one of the most sophisticated writing and counting systems of the ancient Americas, it seems inconceivable that the Maya did not keep written records for economic transactions as they did for religious and ritual activity so well documented in the few surviving bark paper codices. If Classic Maya elites employed codices for record keeping, none have survived to the present, unfortunately.

Conclusions

This exploratory exercise is limited by the available storage data for the Maya area. What is certain, however, is that the political economies of the Classic Maya were dependent on stored surplus of material goods. The absence of monumental central storage would seem to indicate that most storage was practiced at smaller scales and dispersed throughout the society. Storage strategies at the household, community, and state levels would have been integrally related to an economy dependent on tribute as the principal mode of material support to the state. Storerooms in Maya palaces would have been used to house tribute collection and the products of exchange activity. If so, the political system must have been organized to marshal surplus and social obligations via a complex hierarchical structure incorporating community and domestic levels of organization, which would have reduced the need for a large central bureaucracy. Such a corporate political structure would favor a high degree of autonomy in community and domestic-level affairs as long as tribute and labor were supplied to the state on demand.

A tax organization focused on communities may resemble the Maya *ch'ibalo'ob* (Farriss 1984; G. Jones 1989; Roys 1943, 1957) and Aztec *calpulli* (Carrasco 1971; Caso 1963; Kirchhoff 1959) at the time of the Conquest. In addition, the long-distance movement of tribute goods, including bulky perishables, need not be constrained by inefficient modes of transportation (foot power), as is so often argued for

Mesoamerica (see Sanders and Santley 1983; Santley 1984, 1994), because the costs of transshipment would have been absorbed by the payers and not by the state that received tribute (Berdan 1977; Chamberlain 1951; Hassig 1986). This kind of political control does not require a large bureaucratic apparatus and may serve to increase production by encouraging (or forcing) farmers, albeit indirectly, to overproduce.

A working hypothesis inferred from storage organization indicates that a tribute mode of surplus extraction structured the Maya political economy. Without clear evidence for large-scale centralized storage and substantial warehouse facilities for trade, labor service, trade, and exchange were probably secondary in importance for the political economy, providing additional avenues for elite wealth, prestige goods, and a mechanism for redistribution. Under decentralized storage systems, most surplus is produced and stored locally, and a portion is appropriated by the state. When the time comes for stores to be physically “skimmed off” and transferred to political elites, surplus is then redirected, redistributed, or perhaps restored. Therefore, the relationships between storage (movements) of goods may be a key feature of the tribute economy and Classic Maya political centralization. In this way, surplus is spread throughout the society and moves up the storage hierarchy (household-community-state) only when mandated by the state. If the lowland Maya economy was organized around tribute and decentralized storage, political organization would be only quantitatively different from other Classic Mesoamerican societies but qualitatively distinct from other early world state societies.

The challenge of recognizing storage variation and its organization remains a significant methodological challenge for archaeologists. To understand the Maya political economy and its material foundations, it is necessary to conceptualize storage as an economic process involved with not only production and exchange but also distribution and consumption. As argued, storage is a factor in all these processes and is itself a significant economic process that provides material means to support complex economies. Unfortunately, there is little attention given to storage in studies of the Maya economy. In Masson and Freidel's (2002) edited volume on the subject, surprisingly, the topic of storage is mentioned briefly only once. As storage is treated more analytically and becomes better understood, it will ultimately provide new insight into the complex interworkings of ancient political economies. Conceptualizing the economy as embedded in sociopolitical institutions and linked to economic as well as noneconomic factors, an instituted process as Polanyi (1957) argued,

challenges researchers to employ a holistic view of storage and the political economy.

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STORAGE PLACES IN THE MAYA AREA

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Introduction

In the cities of most of the ancient cultures their storage buildings are readily recognizable, as may be seen, by way of example, in the large Roman granaries or the Inka grain houses. However, we have not been able to establish the type of building used for this purpose in the Maya area, as we do not have the archaeological, iconographic, or literary information necessary to identify any such buildings.

What is traditionally considered a “storage space” in this area is not so much a building, but rather an underground store known by the name of a *chultun*, this being a Maya term that has been defined as an “excavated cistern or silo to store maize or collect rainwater” (Barrera 1980: 144). These *chultuns* abound in a large part of the Maya area and come in different shapes and sizes, and while they were primarily employed to store rainwater or perishable food, on some occasions these were used as special areas for offerings and burials or for other ritual uses and, as such, may be considered as multifunctional areas.

While much has been written about these structures, very few studies have been made regarding other possible storage installations in this area, because a lack of evidence has handicapped research in this respect. However, it would not be unreasonable to imagine that a complex society such as the Maya would also have far larger and specially constructed storage areas, and that it is then necessary to gain more substantial knowledge regarding the storage systems used in the past and their workings, as this information would, in turn, provide a greater awareness of how the Maya economy actually worked. To this end, we consider it necessary to differentiate between the storage systems used by the common people and those associated with the ruling classes and attempt to answer a whole series of questions: Where did the ancient Maya keep their food products? Were these similar to the *chultuns*? What types of structures or rooms were used to store luxury goods acquired by the ruling classes through tribute, the exchange of gifts, and through importation from distant

regions? How visible were all these spaces? Where were the royal libraries and weapons stored?

It is difficult to answer these questions when all that remain are empty buildings and the material culture vestiges generally found in a debris context. It is also necessary to bear in mind the large regional and temporal differences within the Maya culture with respect to political organization and economic systems. Here, a brief introduction on all these aspects would help to obtain a clearer picture.

Considerations Regarding the Economic System of the Classic Maya Civilization

The Maya civilization developed throughout a long period over a vast expanse of territory covering more than 324,000 square kilometers, one characterized by great environmental heterogeneity. The diversity is such that any study of the Maya area has to be made by distinguishing the two large subareas: the Maya lowlands—these are in turn subdivided into the northern lowlands and the southern lowlands—and the Maya highlands, this being a separation responding to elements of both climate and topography. This separation is important as the inherent characteristics of each of these territories from the rainforests and seasonal wetlands of the lowlands to the mountainous and volcanic lands of the Altiplano had an influence on the methods of production and exchange in each of these regions and were decisive in the formation of the cities and the urban models adopted and developed in each case (Muñoz-Cosme 2006: 15).

Furthermore, and with respect to the political organization of the Maya, while there were indeed very powerful and dominating ruling centers, the ruling classes did not hold a total control over production and, as such, it is not possible to speak of just one Mayan economic system at state level, but rather of regional and, in some cases, interregional economic systems. This then means that, with the exception of certain relevant cases, the control exercised by the leaders of the different political bodies over production and trade would have been restricted only to certain products.

How then did the Maya economy work? This is a difficult question to answer on account of what we discussed above. It is one that has given rise to different theories. P. Rice (2009a: 149; 2009b: 81) suggests the presence of a relatively decentralized political-ritual economic system, characterized by a ritual form of production, palace economy, elite feasting, and periodical markets, set within a rotating network of geopolitical capitals based on *K'atun* (20-year) and *may*

(256-year) cycles, that is to say, the accumulation and circulation of material goods coincided with the feasts sponsored by the court and the periodical markets held on calendrical festivals. Other authors (Dahlin et al. 2007), on the basis of geochemical analysis of certain sites presumably used as markets in centers of the Yucatan Peninsula, are more inclined to defend the existence of a market economy, which would have stimulated the import and trade of food products. This is a theory that refutes some of the traditional beliefs of Maya specialists who have always held that the Maya lowlands were self-sufficient in food and basic resources, and that it was subsequently not necessary to develop long-distance trade routes to redistribute the same. While nobody refutes that these routes ever existed, it is considered that these were used for the transportation of other types of products, such as exotic or luxury items, to satisfy the needs of the ruling classes in their rites and ceremonies, as well as other raw materials necessary for daily life but exclusive to particular areas, such as salt, cacao, cotton, and certain stones and minerals employed in the manufacture of tools and utensils, such as the hard volcanic and obsidian stones (Masson 2002: 10–12; Demarest 2004: 152–160).

If this were so, the population would have gained access to these more essential products at local or regional markets, while the elite would have gained these as tribute. This tribute had to be paid by people in subordinate centers to the rulers of dominant centers. This practice is readily known to us through iconographic and epigraphic sources. The local dignitaries would have, in turn, received tribute from the local population in the form of basic food products and other craft objects. Luxury items were exclusive to the elite and would have been received in the form of tribute or through gift exchange. These were not goods that could be obtained at the local markets, but only through complex social acts geared to promoting or strengthening political alliances or specific relations between the individuals involved, this being one of the most favored subjects of Maya iconography (Figure 12.1). It is also possible that certain exotic products found in distant regions, or even outside the Maya area, could have been obtained by importation, such as certain minerals and precious stones of highly symbolic and even magical value used in the preparation of pigments and in the preparation of valuable objects for the ruling classes.

Be that as it may, it is clear that the lack of a highly centralized economic system did away with the need for large containers to store food or other basic products and much less for specific warehouses, such as the granaries so commonly found in other cultures. Examples of these are the Inka *qollqa* storehouses that served to meet the

temporary influx of people during military expeditions or ceremonial activities, or indeed the Roman granaries that were seen as an ideal solution to feed the nonrural population (particularly townsmen and soldiers). This is to say that the Inkas, the Romans, and many other Old World civilizations were all dependent on intense forms of basic food production in order to feed their citizens. These, in turn, had to be protected by soldiers and other forces, and hence the need for warehouses to store these provisions, which were only distributed under the strict control of the ruling classes.



Figure 12.1 Painted vase that shows a tribute scene in a Maya palace (sacks of beans, fans, stacks of textiles, and a black tripod ceramic plate). Photo ©Justin Kerr, K2914 (www.mayavase.com).

However, in the Maya area, characterized by an economic system in which different means of production and exchange coexisted among dispersed and apparently self-sufficient populations, the storage requirements were essentially of a domestic and, subsequently, perishable nature in the same manner as their dwellings. In this respect it is pertinent to refer to the ethnoarchaeological study made by Michael P. Smyth (1991) in the Puuc area (Yucatan) (see Smyth, [Chapter 11](#), this volume), in which he showed a number of examples of how this activity was still being carried out in certain Maya communities of Yucatan. In this respect one of the main archaeological sources is found at the Joya de Cerén settlement, the subject of the following section.

One has to ask where the Maya stored the remainder of the products obtained through tribute and gift exchange, which were delivered to the ruling classes at their impressive palaces. In our opinion (Vidal-Lorenzo and Muñoz-Cosme 2009: 115; Vidal-Lorenzo, Muñoz-Cosme, and Valdés-Gómez 2011: 219), shared by other authors

(Houston and Inomata 2009: 255), these items were stored within these same palaces which, in addition to serving as the places of residence for the elite, also acted as foci of authority. This hypothesis may be made on the basis of findings such as those at Copán and Aguateca and from certain conclusions gathered from the recently researched settlement of La Blanca (Petén, see below).

Domestic Storage

As we have already indicated, the best archaeological testimony of the type of storage that may have been employed by the Maya in prehispanic times to conserve their food products and other everyday items is found at the archaeological site of Joya de Cerén, located in the Zapotitlán valley (El Salvador). In approximately AD 600 the eruption of the Loma Caldera volcano buried the area in a thick layer of volcanic ash that preserved the remains in excellent condition, and from which it subsequently earned the name of the “American Pompeii” The excavations at the site on successive occasions ever since its discovery in 1976 (Sheets 1983, 1997; Sheets and McKee 1989, 1990; Sheets and Kievit 1992; Sheets and Simmons 1993; Sheets and Brown 1995) showed Joya de Cerén to be a settlement organized in domestic groups that had three functional types of structures: living quarters, kitchens, and storage facilities, which at one time could have been associated with a steam bath or *temazcal* (McKee 1997: 243–255).

The spaces used for storage were raised at the south of the building used as living quarters (McKee 1990: 90–108). Here an adobe clay platform supported a small perishable structure, the walls and roof of which were formed entirely of branches, twigs, and clay in a wattle-and-daub construction system known locally as *bajareque*. These same materials were also used to make the single shelf or *tapanco* generally found in these small cellars and that were used to hold some of the storeroom items, with the remainder being kept in large baskets, pots, and other containers. One of the best preserved storage areas at Joya de Cerén is Structure 7, which contains eight large pots, a large bowl, and a shelf along the west wall (Lentz et al. 1996: 251). Other smaller bowls also served to keep other items, and particularly foodstuffs, neat and tidy. This may be seen in Structure 4, a small building formed by two areas that were initially used as living quarters and later as a storage area with its corresponding *tapancos*. This reveals the types of items that were normally stored in these structures, ranging from numerous storage and serving pots to utensils made from obsidian, stones, and mortars, and even a drawer for maize that still contained a number of cobs (Lentz et al. 1996).

The results obtained from microscopy and flotation analysis of the organic remains contained in urns and smaller items of pottery show that the Joya de Cerén storehouses were used to store all types of domestic items and not just food. In this way, the scientific examination of the organic remains preserved inside many of the pots deposited in the Joya de Cerén storehouses, and specifically those of Structures 4, 6, and 7, shows that at least four types of products were kept in these areas: food, textile fibers, aromatic woods, and other items of general use (Figure 12.2).



Figure 12.2 A storage house of Joya de Cerén. Photo M. L. Vázquez-de-Ágredos.

There is evidence of all these grains, seeds, skins, barks, and woods that were used for foodstuffs (maize, beans, chili, cacao, pumpkin, guava, plum, and grasses), ritual practices (aromatic bark of cedar and pine), medicines (*capulín* cherry), and textiles (cotton, agave, and *capulín*). Their discovery together with the utensils used for preparation and consumption—pestles and mortars, obsidian cutting knives, and clay pots to serve and eat food—explains the great importance of these storage areas for the individuals who lived in each of the domestic groups at the Joya de Cerén. They served to keep the stores required for daily life in prime condition. This would then explain the presence of propitiatory offerings that have been found in the roofs of some of these buildings, including cinnabar, jadeite, and

other greenstones of similar economic and symbolic value for the Maya (McKee 1990: 90–108).

From the excavation and study of the storehouses at Joya de Cerén it is then possible to extrapolate these findings in order to establish the standard type of area employed for this purpose by the ancient Maya culture.

Perishable Buildings

It is very possible that the storehouses used throughout the Maya area to store domestic and everyday goods, including food, were built of perishable materials appropriate to each region. The construction of these buildings in the Maya lowlands and transitional zones would be made of mixtures of *bajareque* (wattle-and-daub) and lime and not the *bajareque* and clay characteristic of Joya de Cerén and other highland settlements where adobe clay was more abundant. It is precisely on account of this perishable nature that these structures have remained “invisible” to archaeologists other than those that remained buried at the site in El Salvador following the volcanic eruption at the start of the Late Classic period.

In this settlement, as in other settlements of the Maya highlands, lowlands, and transitional zones, there is archaeological evidence that the living quarters, kitchen, and storehouse were set beside a vegetable garden, which provided much of the food preserved there. In some instances the buildings were adjoined by a “sacred garden” that served for the cultivation of plants of a ceremonial and aromatic nature in the center of the Maya cities, that is, beside the sacred buildings, like Group E of Uaxactún (Harrison 2001: 75). Alongside these domestic vegetable gardens of the common people and the sacred gardens that served the ritual purposes of the elite, these perishable structures served the important purpose of keeping all these domestic items fresh in a far better way than a more solid, stone construction could.

Location Close to Living Quarters

This arrangement is seen not only from the archaeological evidence found at Joya de Cerén but also as a result of ethnographic investigations. In this respect, it is common to find the houses of modern Maya communities set alongside a building of more modest dimensions that is used for storage (Harrison 2001), and that generally housed all types of items and not just the products of the domestic vegetable garden set just a few meters away.

Presence of Internal Fittings for Better Use of the Storage Area

These storehouses would commonly have been fitted with shelves such as those found in the Joya de Cerén storehouses, and would have been used to hold domestic goods and objects in pots and containers. These shelves would most probably have been made in wood from the surrounding areas.

Distribution of Items in Clay, Wood, or Fiber Containers

With the exception of the wooden box used to store maize at Structure 7, the containers found in the storehouses at Joya de Cerén are all pottery. However, it cannot be discounted that the ancient Maya would use this type of container together with others made from wood and fiber, which would not have been recorded by archaeologists on account of the perishable nature of both of these materials. In the iconographic representations found on ceramic pots and on the vaults of a number of palaces in Campeche and Yucatan, the god K'awil has been painted together with sacks of this type full of grain and bearing inscriptions referring to abundance and prosperity (Staines 2008: fig. 7).

Use for the Conservation of Domestic Items and Not Just Food

In accordance with the findings at Joya de Cerén, the storehouse built alongside the living quarters, kitchen, and vegetable garden was used to store all types of domestic goods and items and not just food. Furthermore, these small buildings were not suited for the conservation of all types of food, but purely those of agricultural nature. In this respect, the speed with which meat decomposes in such hot and humid conditions as those so prevalent in the Maya area made it necessary to consume meat shortly after the animal had been slaughtered; however, in all reality, meat was a luxury almost exclusively reserved for the elite (Tiesler and Cucina 2005: 43). To the same extent, fish could not be kept in these types of storerooms and had to be conserved by other means, one of which possibly including the water distribution channels (Sharer 1998: 430).

Use of Offerings

The importance of the items deposited in these domestic storehouses explains the presence of offerings placed there to guarantee their safekeeping and the ensuing well-being of those who benefited from their consumption and use.

The storehouses described above most probably correspond to the type most widely used during prehispanic times to preserve domestic goods, in accordance with archaeological findings and the customs recorded ethnographically to this day. However, we should not ignore that other spaces were also available to the ancient Maya for this purpose in the form of caves. The proximity of many caves to the dwellings in ancient cities and their cooler air made these an ideal place for the preservation of food products in general, and the frequent archaeological discoveries of rustic, domestic pottery of varying shapes and sizes all point to the possible use of these caves as storage spaces in the Maya area over the prehispanic period, possibly in much the same way as other ancient Mesoamerican cultures, such as the Teotihuacan, did (Manzanilla 2011: 11).

Water Storage

Water was one of the elements kept under the control of the ruling classes, particularly in the dry season, as this was a substantial and essential element for both day-to-day life and for the construction of their cities. The natural location of the Maya area, subject to variable rainfall, with periods of heavy rain and the ready availability of water interspersed with drier periods and drought, forced the leaders to establish water collection and storage systems to ensure that this was employed and rationed in a suitable manner.

In this respect, when studying any Maya settlement of a certain size, it is possible to observe the different architectural elements employed to gather and store sufficient water to cover the daily and urban requirements of their populations. These range from the simplest domestic systems known as *chultuns* up to the ponds and water reservoirs found in the large lowland centers, such as Tikal, Nakum, Caracol, or Calakmul. On many occasions these were formed in natural depressions or hollows, but transformed and raised by dikes and dams built out of stone that served to keep reserves and to guarantee the conservation of rainwater to supply the city.

The construction of ponds and reservoirs increased considerably throughout the Classic period, and here the Maya needed to consider both the means of holding the water and, even more essentially, the means of collecting it. This was performed by studying natural water impoundments that were then raised and fed by channels that carried water to these reservoirs during periods of heavy rain. An extensive network of channels has been recorded in Tikal that fed seasonal rain to a series of reservoirs. These reservoirs were prepared and built in naturally suited areas or, on occasion, by taking advantage of artificial

depressions left by quarries. In more elaborate cases the ponds or reservoirs were covered by stone, to provide better impoundment and improve the quality of the stored water. On some occasions secondary cisterns, in the form of *chultuns*, were built at these impoundments to serve as storage places during long periods of drought and when the reservoirs dried out.

Even though these artificial lakes may not be readily appreciated today as they are all dry, their presence was essential in the large cities where they were more highly developed and where they would similarly have played an important role as urban architectural elements, as is the case of the Palace Reservoir set between the Central Acropolis and Temple V at Tikal.

Other large natural impoundments of water were the *cenote* freshwater sinkholes in the north of the Yucatan Peninsula; these are enormous eroded depressions in the limestone bedrock where groundwater would gather. Important Maya settlements were built around these *cenotes*, and, in this respect, it is interesting to note that, according to Scarborough (1998, 145), the rulers gained control of this essential resource by ritually appropriating all day-to-day activities associated with water by the population under their rule, making use of sophisticated water rituals. The *cenotes* were subsequently held as sacred places.

The *chultuns*, to the contrary, are normally associated with residential structures, and it is frequent to find these excavated in the same platform that supports the dwellings. The openings to these *chultun* cisterns was surrounded by a sloping rendered area to allow rainwater to drain into them. These *chultunes* acted as complete water cisterns and were particularly abundant in the drier regions, such as the north of the Yucatan Peninsula (McAnany 1990; Vidal-Lorenzo 1999: 9–10, 26). Some of the most outstanding *chultuns* are those at the Sayil Palace; these serve as the main water supply source to the area as there was no *cenote* in the vicinity (Sabloff and Tourtellot 1992: 158).

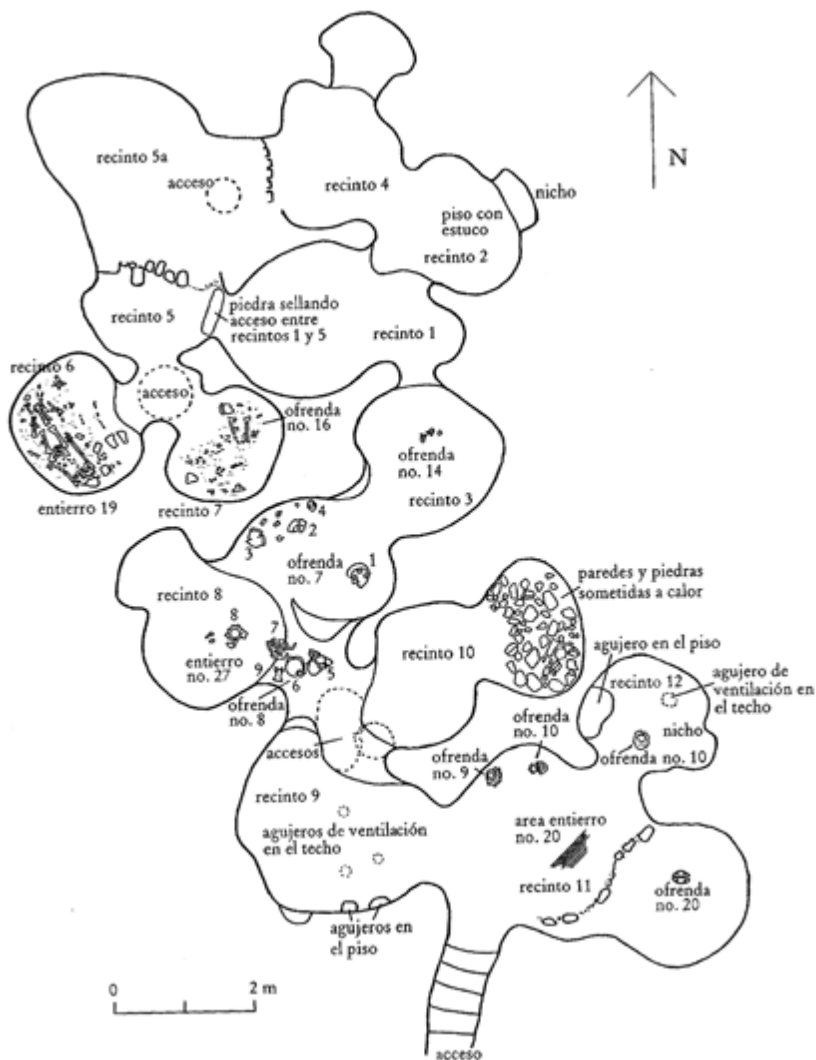


Figure 12.3 Plan of *chultun* 7B-1 of Topoxté with its network of twelve underground chambers (Hermes and Calderón 2000: fig. 52).

It is believed that the *chultuns* found in the southern lowlands served additional purposes, such as storing grain, preparing fermented beverages (Dahlin and Litzinger 1986), or for ritual motives. Among these latter, we may refer to those on the island of Topoxté and surrounding areas in Petén; investigations here (Hermes and Calderón 2000) have revealed the presence of various types of *chultun*. One of the most outstanding of these is *Chultun* 7B-1 at Topoxté, a network of twelve underground chambers in which numerous burials and offerings were laid (Figure 12.3). On other occasions, the *chultuns* appear in open public spaces, such as causeways or plazas, perhaps for

rituals or feasting purposes (Tourtellot, Everson, and Hammond 2003: 100) (Figure 12.4).

In other regions it was not possible to store water for domestic use in this way because of the uneven terrain. This is the case of some Preclassic settlements, such as Chocóla, in the southwest piedmont of Guatemala. There a complex arrangement of channels formed in rough slate and clay supplied rainwater for the domestic cisterns below primitive constructions, which allowed these cisterns to be supplied at times of heavy rainfall (Valdés-Gómez and Vidal-Lorenzo 2005: 43). Similar channels of the same period have been found at Kaminaljuyú and Takalik Abaj.

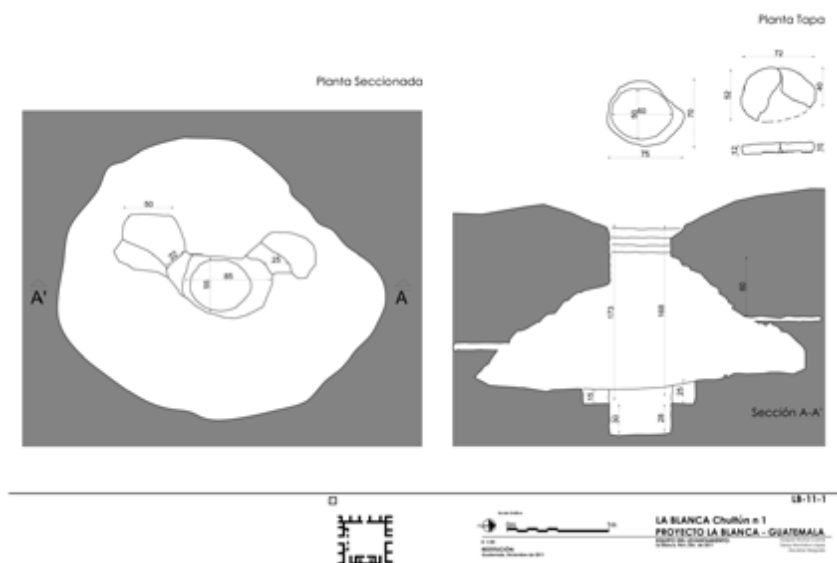


Figure 12.4 Drawing of the *chultun* discovered in the causeway of La Blanca, Petén (PLB 2011).

Palaces and the Storage of Luxury Goods and Other Tributes

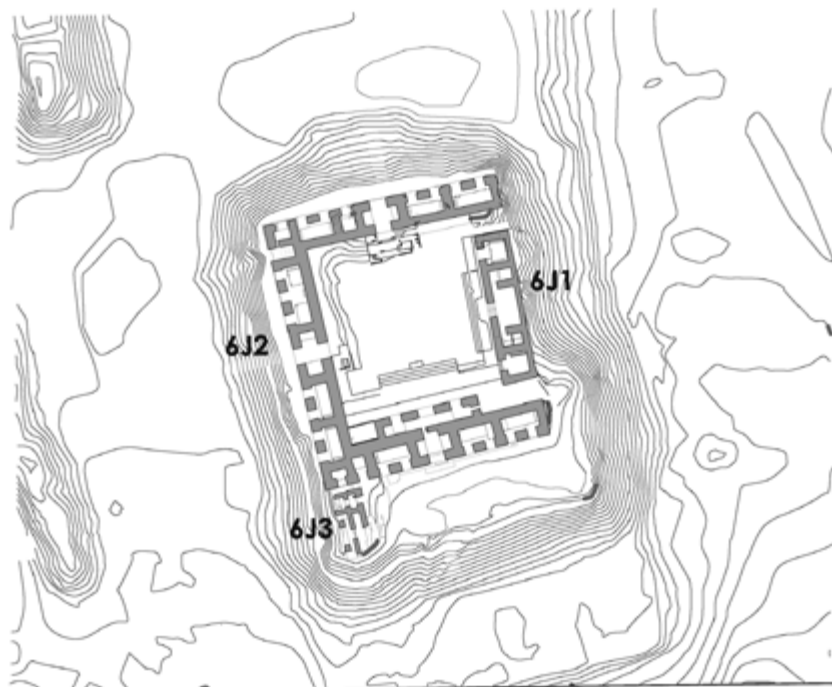
Maya iconography has shown us the formal audiences that were held for the handing over of tribute and gifts to the Maya rulers. This all led to a hoard of valuable objects in the form of royal treasure that had to be stored away in safe and protected places. This would have required the use of a number of rooms in the palace buildings throughout the Classic period, though it has not yet been possible to ascertain the specific rooms used for these purposes within the palaces. The rooms closest to those where the audiences were held would have undoubtedly been the most convenient for these purposes,

as would the more private rooms where entry was more strictly controlled in order to ensure the safekeeping of these valuable items.

One of the few examples that has been verified by archaeology is the east room of Structure M7-22, the “House of the Masks” at Aguateca (Houston and Inomata 2009: 298), the only room in the entire palace structure that contained numerous royal belongings (pyrite mirrors, bone and shell ornaments, ceramic masks, and so on). According to those who discovered the site, when King Tahn Te’K’inich was forced to abandon the palace, he stored all of these objects in this room and sealed the entrance, perhaps with the hope of returning to recover them.

The excavations made at the ancient city of Copán (Honduras) and, more precisely, those in the urban Sepulturas sector, show that certain “noble houses” were also employed as storehouses during the Classic period. This was the case of those at Group 9N-8 (Hendon 2009: 105–129), where excavators found ceramic vases of different sizes in a number of rooms containing materials of high economic and symbolic value in the process of production, such as pieces of shell (Hendon 2009). This may suggest the dual function of these areas as both workshop and storehouse. In this respect, we must assume that there were also areas allocated to the practice of the arts in the Maya palaces, and it would then have been necessary to safeguard the expensive raw materials required to this end—many of them brought along long trade routes—within these rooms.

One of the sites where remnants have been found of murals made with pigments imported from far off places is that of La Blanca (Vidal-Lorenzo and Muñoz-Cosme 2007), a settlement set in the basin of the Salsipuedes River, a tributary of the Mopán River, in the Petén department of Guatemala, close to the city of Ucanal and not far from cities such as Yaxhá, Nakum, or Naranjo ([Figure 12.5](#)). At the top of the La Blanca Acropolis there is a building in the form of a *C* opened out to the west, which encompasses a square courtyard thirty-eight meters wide, and another palace, named the East Palace, that closes off the courtyard to the east, providing three access points and leaving two side exits on either side of the palace.



**ACROPOLIS
PROYECTO LA BLANCA - GUATEMALA**
EQUIPO DEL LEVANTAMIENTO:
La Blanca, Nov./Dic. de 2010

LB-10-05

Gabor Muñoz Castele
Manuel Irujo Castele
Lorena Emparedor Montejano
Gabriel Gómez Pastor



RESTITUCIÓN:
Valencia, febrero de 2011

Raquel Marcano Fuentes
Loury Glauert Sanabrador

Figure 12.5 Plan of the Acropolis of La Blanca (PLB 2013).

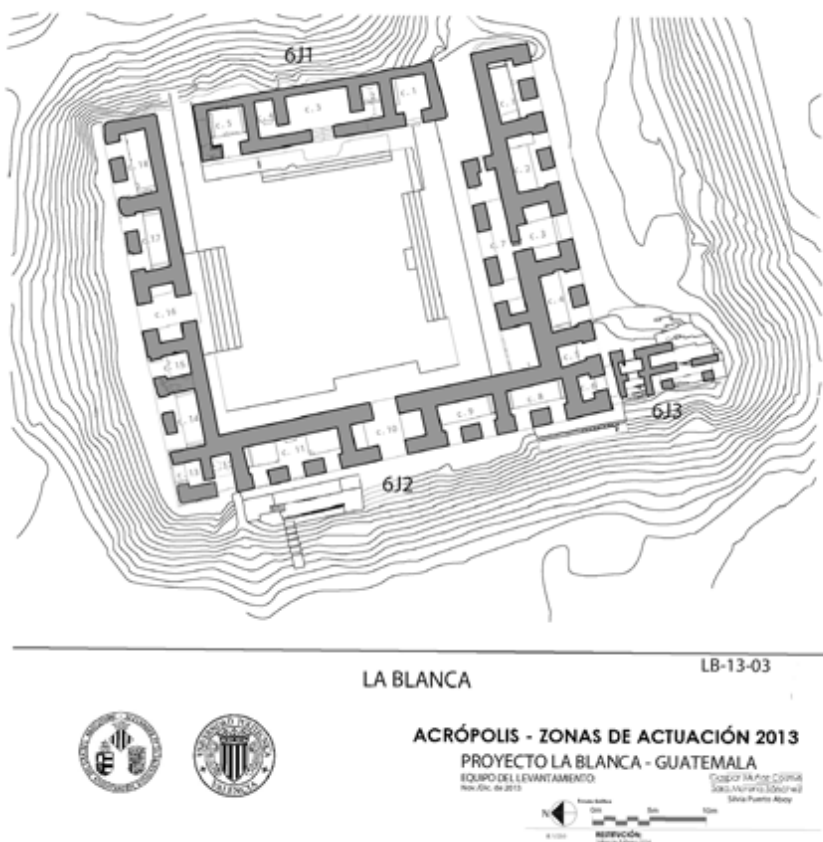


Figure 12.6 Plan and elevation of the Orient Palace (6J1) of La Blanca (PLB 2010).

The East Palace has five rooms and looks over the inner courtyard of the Acropolis, which formed the most important monumental complex at the site. People approached the main chamber from a large central door reached by a flight of steps. This was undoubtedly the governing palace of the city, and this enormous hall, with its spectacular vaulted ceiling more than four meters wide and seven meters long and reaching up to more than six meters at its highest point, would have been the formal area for royal audiences (Figure 12.6). Evidence of this appears in several high-quality graffiti that can still be observed on its walls (Vidal-Lorenzo and Muñoz-Cosme 2009).

On observing the great architectural display appearing in the design of the palace buildings of the Acropolis, with their large vaulted ceilings and spacious rooms six meters wide complete with large benches, it is then curious to note the two small rooms set at each side of the main chamber. These rooms are both around two meters wide

and vaulted in a transverse direction to the centerline of the building and are approached by doors set off-center, the openings of which were set at right angles to the inner face of the façade. Inside the room, a bench takes up almost half the space. This then means that there are two smaller rooms, each around eight square meters, that can be entered only from the main chamber. This main chamber of the East Palace and the entire complex of the Acropolis would have been defended by guards who protected these architectural symbols of power and all the objects held within the Acropolis, even though the governor would have resided in another part of the compound. It is then reasonable to suggest that these small rooms set off the reception room would have been used to store valuable objects given to the governors as gifts or tribute, to which only the governors themselves and their closest assistants would have had access.

A number of similar cases may be seen at Tikal (see Smyth, [Chapter 11](#), this volume), such as building 5D46, one of the largest palaces of Tikal and one of highly complex construction and scale, which similarly contains two rooms set off its north wing, or building 5D49 in the same Central Acropolis. The room at the southwest end of Building N at Nakum could also have been used for this same purpose. The small dimensions of these rooms and their total privacy and safety all appear to support this hypothesis, along with the fact that these are only to be found in palaces associated with those in power.

Finally, there is a very recent discovery made at Chilonché, a Maya settlement in the same archaeological region as La Blanca, where two storage places placed in the rear walls of Rooms 1S and 5S of 3E1, a multistoried palace on the top of the Acropolis with different building phases, were found (Muñoz-Cosme et al. 2014) ([Figure 12.7](#)).

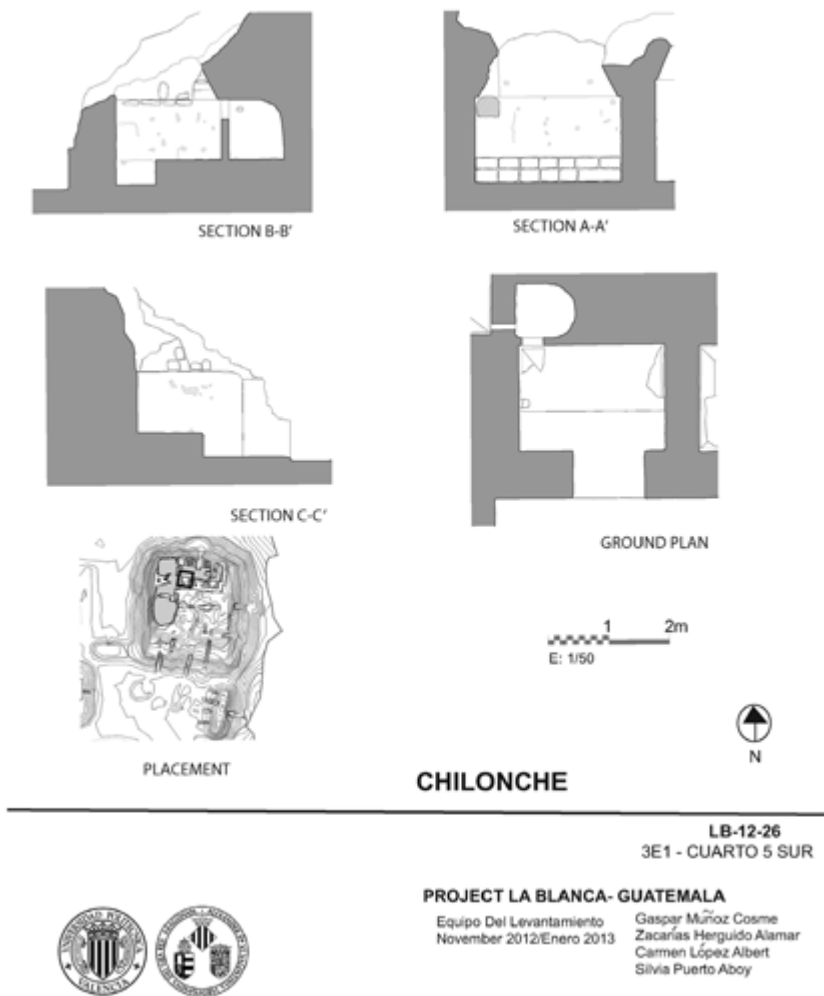


Figure 12.7 Plan and section of Chilonché Room 5S (Structure 3E1), with a storage place in the rear wall (PLB 2012).

Conclusion

In this chapter we have tried to delve further into certain aspects regarding the storage systems used in the Maya area on the basis of a series of questions that we have attempted to answer by resorting to archaeological, iconographic, literary, or ethnological sources. While we are aware that we have not been able to answer all of these questions fully, we now have a more complete view of this interesting subject, which has not been studied in depth in the archaeological literature. Given the general consensus that the structures to store food and other domestic items of the common population were always

of a perishable nature, in the same manner as their dwellings, it is only through cases such as that of Joya de Cerén and other ethnographic studies that we may provide further information. Even so, further geochemical research on the room groups may provide additional data regarding the food products that were stored near the dwellings.

The water storage buildings, on the contrary, tend to be very well documented, and even though occasionally these may seem “invisible,” a detailed investigation of the archaeological sites could bring them back to life.

With regard to the proposal that elite property was stored within the palaces, it is still necessary to make a more intensive study of the uses and functions of the different rooms of the palace buildings, and particularly with respect to their use as either living quarters or for the formal and necessary functions of the rulers. It is clearly necessary to consider all the needs brought about by the exercise of power, as well as social and political representation, including those concerning storage. These may be revealed through the architectural spaces and rooms that we are able to identify in those palaces that were the focus of power during the Classic Maya period. In this respect it has to be taken into consideration that these palaces were subject to different renovations and occupations throughout their existence, and that it is then almost impossible to find this evidence of the past through archaeology, not even with respect to their last period of occupation, when the rooms seem to have been emptied. Aguateca may be an exception. It is therefore necessary to resort to other sources of information, such as iconography or literature. As such, when we contemplate scenes showing the exchange of gifts or tribute, such as those captured on the beautiful Maya polychrome ceramics, we have to consider that all of these objects (vases, jaguar skins, feathers, blankets, beans, cacao, and so on) had to be suitably and immediately stored away in rooms close to those where they were received ([Figure 12.8](#)).

Since Maya palaces are characterized by having numerous rooms of different size and access, some of these must have undoubtedly served to store the complicated headdresses, delicate costumes, cosmetics, and other paraphernalia used by the members of the elite in their ceremonies and rituals. These are represented on both polychrome vases and the extraordinary, though regrettably very few, mural paintings decorating the interior of these buildings. These palace complexes must also have contained areas assigned to libraries, archives, and the storage of musical instruments and weapons. This at least was the function assigned to certain rooms in the Aztec palaces

(*tecpan*) as shown by their illustration in certain codices and other Nahua pictorial documents. One of the most striking of these is the palace of the prince and poet Nezahualcóyotl in Texcoco (Johansson 2002), as illustrated in the *Map of Quinatzin*, where the protagonist appears together with his son in the main room that leads on to the central courtyard (a square, sunken courtyard). This was where high-ranking personalities, the lords of the Acolhuacan's royal council, were waiting. A number of rooms may be seen around this courtyard that appear to store objects that have been identified as being tribute, weapons, and musical instruments (Evans 2001: 242).



Figure 12.8 Painted vase that shows the handing over of tribute (blankets) to Maya ruler. Photo ©Justin Kerr, K8089 (www.mayavase.com).

It is possible to observe some conceptual similarities between that shown in the illustration of this palace and, by way of example, the palace complex at the Maya Acropolis of La Blanca, or recent discoveries at Chilonché, which reinforce our initial hypothesis that the Maya palaces also contained areas that served to store luxury and highly symbolic objects. In this way, the Maya palace may then be seen as both a place of residence of the elite and as a symbol of their wealth and prosperity.

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STORAGE AND ADMINISTRATION IN THE AZTEC EMPIRE

José Luis de Rojas

Introduction

Administration is one of the tasks an empire does. Our interpretation of the Aztec Empire has changed a lot in the last few years. We now propose a model of the empire very different from the formerly held one, but both models have deep relations with the two main topics of this chapter. Robert Barlow (1949) made a map of the Aztec Empire from the point of view of a territorial domain, with continuous occupation of the land, excepting one province, Xoconochco, which was isolated from the rest. This model was based on the *Matrícula de Tributos* information in the second part of the *Codex Mendoza*, due to the very small photographs of the *Matrícula* he had (Barlow 1949: 7). Barlow interpreted every page of the *Matrícula* as a tributary province, the first town mentioned was the capital city. According to the *Codex Mendoza* Spanish texts:

The eighteenth towns drawn and named on the following two pages were ruled by a governor, called *petlascalatl*, assigned by the lords of Mexico; and although in each town they placed a *calpixqui*, like a majordomo, who was in charge of collecting the rents and tributes that the said towns gave to the state of Mexico, all the said majordomos assisted the said *petlascalatl* as their governor. (Berdan and Anawalt 1992: 4:44)

The text corresponding to the next province (Cuitlahuac) makes clear the structure and functions of these administrative staff:

The Lords of Mexico, after having conquered the twenty-six towns drawn and named on the following two pages, placed in each town *calpixques* and, in the principal one, a governor to rule over them, to maintain peace and justice, assure tribute payment, and prevent rebellion. (Berdan and Anawalt 1992: 4:47)

These texts and the next pages representing the towns and tributes listed guided Barlow in drawing the map of the empire with the thirty-eight provinces, named after the first town represented that was the capital or, better said, the home of the governor. Each of the other

towns housed a *calpixqui* who was in charge of the collection of the tributes and the delivering of them to the provincial governor. The other obligations of the *calpixqui* had almost disappeared from the modern studies, and this is true also for the governor, rarely mentioned.

Barlow was disturbed by the existence of towns subjected by the empire that did not appear in the tributary rolls, mainly in the answers to the 1577 questionnaire of the *Relaciones Histórico-Geográficas*. He resolved this matter by adding some towns to the provinces and creating a “road to Xoconochco” that made him more comfortable with his map, because this province was no more isolated. It is fair to say that Robert Barlow himself (1949: 1) said that the map was a preliminary and a necessary precursor to the historical study he could never do.

For decades, Barlow’s model was accepted by the scientific community. So, the Aztec Empire had been interested more in the tribute exactions than in the political control of the provinces. The main objective of the administration system was to recover tributes of the provinces and manage them from lesser towns to the provincial capital and then to Tenochtitlan.

Scholars became less and less comfortable with this model and in 1986, things began to change. The process lasted until 1996. There was a nice coincidence since in that year the two books that changed our minds about the Aztec Empire appeared (Carrasco 1996; Berdan et al. 1996). Both are the result of two summer seminars assembled in 1986, one in Mexico City (Carrasco) and the other at Dumbarton Oaks.

The participants in the last conference proposed a different map, based on more sources than Barlow’s map was and with a slightly different interpretation of the tributary rolls:

The most significant innovation of the present study is our focus on the individual towns and places within the Aztec empire. From its inception, our research placed an emphasis on the analysis of political economy, and artistic characteristics of specific towns, and our most interesting findings flow from this emphasis. (Smith and Berdan 1996: 6)

This had a decisive influence in the changing of the Aztec Empire geographical interpretation and forced scholars to change Barlow’s map, based on these fundamental considerations:

First, Barlow constructed his map from the top down. He plotted the towns for each province as listed in the Codex Mendoza and other sources, but did not consider the local spatial context of towns as polities. Our place orientation allowed us to map the empire from the

bottom up. We first located the relevant towns (drawing heavily upon Barlow's work), plotted them plus their associated towns and dependencies on maps of a scale of 1:250.000. From these locations, we reconstructed local city-state territories. Finally, we considered the imperial status of each town to produce our final maps.[...]

Second, we were uncomfortable with Barlow's practice of extending the boundaries of provinces far beyond the area covered by the Mendoza towns. He added other imperial towns (those known to have been conquered by or subject to the empire, but not included in the Codex Mendoza tribute tally) to the closest province, thereby doubling or even tripling the sizes of those provinces. By maintaining a spatial and analytical separation between the Mendoza towns and other imperial towns, we arrived at significantly different provincial borders and a new understanding of the organization of the empire. (Smith and Berdan 1996: 7)

Because of these considerations, we have now a map in which the most important thing is the relations between different towns, not a continuous territory occupying all the space. And most important: beside the classic tributary provinces, as they appear in the tributary documents, we have a new category, the strategic provinces. These provinces didn't pay tribute in goods, but performed other commissions (see Berdan 1996; Smith 1996). The Aztec Empire is now different from ancient descriptions, more complex, and most of these changes do affect the administrative system and storage, as we will see later.

The title of Pedro Carrasco's (1996: 17) book announces another way of thinking. He took the whole structure of the empire, and that means the three parts of the Triple Alliance, and determined the different roles played by different places.

One of Carrasco's (1991) fundamental ideas, as it was pointed out in former papers, was the intermixture of territories, that is, each of the powers of the Triple Alliance had subjects in the same area, not in separate hinterlands. These are more evident in Maldonado's (1990) study of Morelos, where there were towns with one *calpixqui*, towns with two and towns with three *calpixque*. The most numerous were from Tenochtitlan, but each possible combination is documented.

Carrasco very carefully explained his aims and background. We have important tribute rolls for the Aztec part, not so good for determining the political and territorial structure, and, a different kind of documents for Texcoco and Tlacopan that allows us to identify different levels of territorial units in the Empire, based on their economical obligations and political condition (Carrasco 1996: 70).

If Carrasco's vision is correct, we must conclude that both maps (Barlow's and Dumbarton Oaks) refer only to the Tenochca part of the

empire and that we must add the map of the Tlacopan dominion and the map of the Texcoco dominion, if we are able to do that someday. And we must intermix the three maps, because all the capitals had subjects in all parts of the territory. There are enough reasons to consider that the proposals of the Dumbarton Oak group and Carrasco may be studied following Hoekstra's (1990) proposition that in prehispanic Mesoamerica, the dominion was personal, not territorial; that is, there are not subject towns but subject lords. This can explain the presence of *calpixque* of different parts of the empire at a single town: they did not share the dominion, but each one had subjects of their own. And so on for the lords. Lords who lived in a single *altepetl* could be vassals of different great lords. We return to this topic later on.

All of us believe that the Aztec Empire collected great quantities of goods, and following Carrasco, Tlacopan, and Texcoco, they must have done so. All these items must be preserved somewhere. Better, there must have existed different stores in different places, along the routes of transportation for different purposes. Also each household must have stored its own goods. The empire's tribute system required a complex administrative organization for keeping the accounts, watching the caravans, and controlling the tributaries.

Storage

Water, food, and sumptuary goods are three kinds of things that should be preserved. It is not easy to find other goods that do not belong to one of these categories, but each one has different requirements due to its form, weigh, volume, durability, and so on. Further, needs grow in an exponential way when the amount of products to be preserved grows. Storage has not been a successful topic until recent times at the CEMCA symposium in Mexico City in June 2005 (Bortot, Michelet, and Darras 2012). Before this, we have some timely contributions (Rojas 1987a; see also Manzanilla 1988). We have to analyze different places and storage practice in different institutional contexts. We have domestic, community, and state storage. The primary distinction is between places like Tenochtitlan—and perhaps Texcoco—and the rest.

Tenochtitlan

As we have pointed out before (Rojas 2012), the first consideration we must have is that there must have been a lot of things to be stored in Tenochtitlan. We have mentioned tribute, but people have possessions

—some of them many—and there was also food to be stored for an enormous population. This food must be consumed day in, day out. We know little of this. Archaeologists have not been able to identify storage units in the excavations, and we have only some mentions in the documentary sources. This topic apparently did not interest the chroniclers. So we have only some quotations about storage. Bernal Díaz del Castillo (1975: 187–88) talks about majordomos and treasurers in charge of the houses of the maize and two houses full of all kind of weapons, all registered in books and accounts. There were two kinds of storerooms for different goods, and probably controlled by different organizations. The following quotation may refer to the storehouses mentioned by Bernal Díaz in his first text:

In Mexico there were *troxes*, granaries, and houses in which bread was kept, and a great majordomo, with some lesser majordomos, which received it and expended it with the aid of painted books, in which there was such order that it was marvelous. (Cervantes de Salazar 1971: 1:323; English translation by author)

Probably the following quotation is the most cited, because it has more details about the existence and organization of different storehouses for different products:

Petlascalco: there all the food was stored. Dried maize grains thus were kept in wooden grain bins, more than two thousand [measures of] grains of dried maize of twenty years for the city. And in wooden storage bins were dried beans, *chia*, amaranth, seeds, wrinkled *chia*, salt jars, coarse salt, baskets of *chilis*, baskets of medium and large-sized squash seeds. (Sahagún 1950–82: 44)

The steward in charge of the *Petlascalco* was named in nahuatl *petlascalcatl*, and this is the name of the first town of the first tributary page of the *Codex Mendoza* (f. 20r). Because it is not a place name, it has been transformed in *Petlascalco* by different scholars (see Berdan and Anawalt 1997: 34).

We can identify these storehouses with the *trojes reales*, mentioned by Diego Durán (1967: 2:130).

It is interesting to check the assortment of products kept and the durability of some of them, because the adequate conservation and the restocking of the products guarded are proof of an efficient organization.

Among the contemporary authors that have written about prehispanic storage in Mesoamerica stands Teresa Rojas (1988), who, in her chapter about *cosecha y almacenamiento* (“harvest and storage”), follows the study of Hernández Xolocotzi (1949); she identifies two groups of storehouses for the prehispanic state or imperial and

domestic. The first one disappeared after the Spanish conquest.

This colonial change may be responsible for our lack of evidence. The first Spaniards at Tenochtitlan, as we have mentioned, did know of the existence of storehouses, but these mentions disappeared very quickly. One must wonder who then kept control of these storehouses and their contents. Also, possibly there were provincial storehouses and their destiny was under Spanish rule.

Again, referring to Tenochtitlan, the presence of great lords, housed in palaces, seems to require several storehouses. In Alonso Axayacatl's (a *cacique* of Iztapalapa) last will, dated 1581, storerooms are mentioned for his houses. These were in Iztapalapa, not Tenochtitlan, but this may be an interesting clue:

Item, I have as my property in the said town of Iztapalapa, other houses in the neighborhood of Ucuzacapan, where I have the maize bins in which hundred *fanegas* of maize and eighty of beans and ten of tomatoes and forty of *chili* and thirty of *chia* are stored. (Monjaras-Ruiz 1980: 309; English translation by the author)

In the Tenochtitlan colonial documentary sources analyzed by Calnek *trojes* in some houses in Tenochtitlan did appear (Calnek 1974: 19, 30) (Figures 13.1 and 13.2).

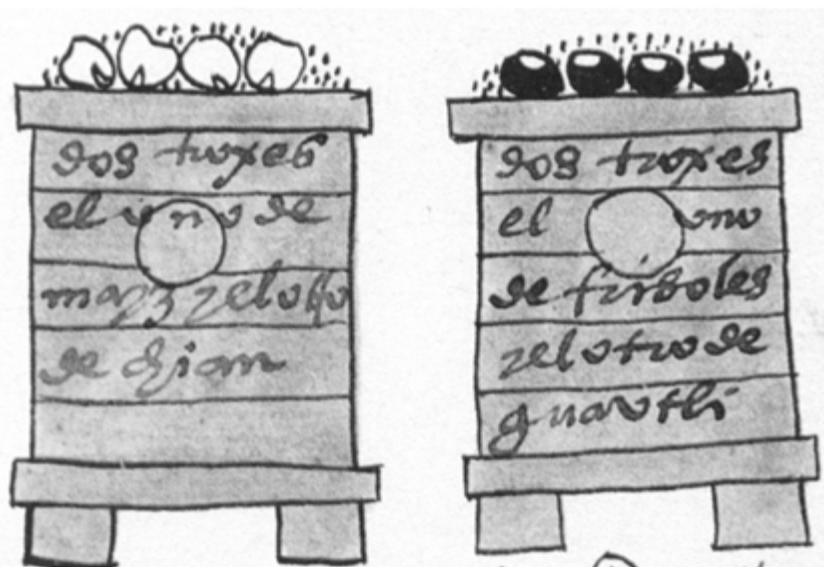


Figure 13.1 Trojes. After Codex Mendoza, f.37r.



Figure 13.2 Troje. After Florentine Codex, book 7, chapter 8, f. 16r.

Storage outside Tenochtitlan

Outside Tenochtitlan we have far less information, and archaeologists, with a few exceptions like Michael Smith (2012b), have not detected storage units. Most of what we now know comes from ethnographical analogy (Seele and Tyrakowski 1985) and the information given by Batalla (2012) in his study of the representation of storage facilities in the codices. It is important that these representations do coincide closely with ethnographic data, with the added value that they were

painted from the prehispanic to the Late Colonial periods. Batalla includes important information like the presence of the Nahuatl words *cuezcomatl* and *quauhcezcomatl* in the sixteenth-century Nahuatl-Spanish dictionary of Friar Alonso de Molina. The first term in modern Spanish is *cuescomate* and the second, the *troje* (Figure 13.3).

As mentioned above, the societal context of storage is important to understand. In the domestic level, storage facilities were inside the house in baskets or pots, often shelled or unshelled in the case of maize. None of these have been preserved. Outside the house, we have specific buildings, like the *cuescomate*, for grain storage, particularly shelled maize, and in the *trojes*, the unshelled maize. We have no evidence of communal storage, but if it existed, probably the same types of constructions, but greater ones, were used. For local rulers and for state storehouses the same consideration could be made, as we will soon see. *Cuescomates* were made of mud and straw:

Its form may resemble a domed or convex recipient with its upper part covered with an onion-form roof, or a pediment made of tejamanil, zacate, or channels as protection against bad weather. The *cuescomate* may have a spherical or pear-like form, but also, as proved by the more ancient constructions observed, it may be elongated like a sleeve. The spherical recipient may rest directly on the floor—that was observed fewer times and is usual in closed ranches—or over a range of stones. This is done because it protects the food from rodents and water that splashes up from soil. Also it provides ventilation, (Seele and Tyrakowski 1985: 9; English translation by the author)

Comparing this description with figures 1–10 in Batalla (2012) the close connection of ancient and modern *cuescomates* becomes clear.

The *trojes* named *quauhcezcomatl* by Molina (1977: 115) seem to have been larger, as it is appreciated in codices like the *Florentino* and *Pièce d'un procès: plan et titre d'une propriétésise a Hueocolco* (Batalla 2012: fig. 14). The *trojes* are represented several times in the *Matriculade Tributos* and the *Codex Mendoza*, but we cannot think there are realistic representations of their size. Nevertheless, the form is close to its real form as is seen when reading the classical description by Clavijero:

They had *trojes* to keep grain. Their *trojes* were square and mainly made of wood. They used the *oyametl*, a very high tree that grows very straight, with a round trunk, subtle and smooth bark, few and slender branches. It produces a very hard wood difficult to break or to get moth-eaten. They formed these *trojes* over a base of pine beams, putting then the *oyametl* trunks in square form until they reached the high they desired. They made notches near the ends of the trunks in order to fit one into the other so close that light can't go in. When they reached the height desired, they cover the *troje* with pine beams and over it a roof to

keep the rain off the grain.

These *trojes* had the door in the upper side and a little window in the lower one. They were so huge that they contained five or six thousand *hanegas* of maize. (Clavijero 1982 [1780]: bk. 7, 29, 231; English translation by the author)



Figure 13.3 Cuescomate as a place glyph. After the *Historia Tolteca Chichimeca* (Ms 54–58, pp. 1–2).

Seele and Tyrakowski (1985: 22) show another construction, named *zencal* (Nahuatl *cencalli*), that they say existed in the prehispanic and colonial periods, but it resembled Spanish constructions and seems to be far from the indigenous traditions, as the authors themselves admit (1985: 27). Batalla (2012) refers to a *cincolotli*, related to the *cencalli*

by Noguez (1995: 57), but it seems to be synonymous with *troje* more than a different type of construction.

We have not found in the documentary sources the subterranean granary that appears in Molina's (1977: 124) dictionary, but Batalla (2012: fig. 19) presents two examples of subterranean constructions in two different codices, one of them the *Florentino Codex*, that may represent these subterranean storerooms. Its existence deserves more research.

The State System

The key question remains: Did the Aztec Empire have a large-scale, central storage system? To date we have no archaeological information (Smith 2012a). Teresa Rojas (1988: 104) argues for a "state reserves and distribution" system in Cuscomatepec (Veracruz), using a quotation from Mota y Escobar (1945 [1609]).

Although there is not enough information about storehouses and storage systems, there is overwhelming information about goods going in and out throughout Mesoamerica, which must have been stored many times in many places. There must have been different organizations at domestic, community, town, and city-state levels. The domestic level is the lowest step of the tribute system. There logically must have been a nobles' storage system, with a domestic part for the daily needs, another part as a reserve, and a third part for keeping the private luxury items. Some of these goods lower-ranking lords must pay as tribute to higher-ranking lords.

Evidence of the quantities of tribute that sometimes appeared in the tributary codices is clear, but the difficulties in the identification of products or the evaluation of the measures used are also clear (Rojas 1997; Rojas and Batalla 2008). The size of the *trojes*, the delivery of loads or units, and the frequency of payment are the key questions. To accept one or another quantity is important for the storage needs. High-valued items need more storehouses, and this means storage in the point of origin, storage on the different intermediate steps, and storage at the final destination. Time is important; we must consider how much time one thing is kept in each place. The storage needs are close to the movement schedule; the more things are stored in each place, the more storehouses are needed, and if they are moving, the same places are occupied successively. But different things may need different kinds of storehouses, and we know only the *trojes* seem to be able to contain grains.

Further, the storehouses need specific designs, proper construction,

using adequate materials, and constant maintenance. This may be included in the necessary management and planning. The Mexicas knew a lot about building, maintenance, and management, as the Chapultepec aqueduct shows; there are two streams, and one flowed while the other was cleaned and repaired.

Important to this effort to understand storage is first to understand what items were moved and stored (Rojas and Batalla 2008). The amounts of items just in the great tributary codices are amazingly high. However, there are more than tribute items. There are vegetables going to Tenochtitlan from the *chinampas* zone via the *pochteca* or merchant traffic, and Tlatelolco's great market, as well as the food and sumptuary good supply of other great cities like Texcoco.

Regarding grain, the *troje*'s capacity is a key point; the low estimate for the capacity of a *troje* is two thousand *fanegas*, and the high estimate is five thousand (see Rojas and Batalla 2008: 200–201). Here we use the two extremes to show the range and not prejudice the results, but we must also accept the size of the *fanega*, which seems to be more difficult than expected to calculate. For instance, Katz (1966) used a measure of 144 liters, and that seems to us very improbable. It seems reasonable to use the *fanega de Castilla* in New Spain in the sixteenth century, a time when most of our sources were written. It has fifty-five liters of capacity, and fifty-five liters of maize weigh around forty-six kilograms. It is important to say that a *fanega* has four *arrobas*, or two loads, two *arrobas* each. So, the standard load carried by porters was twenty-three kilograms. It is important to count the number of carriers needed to move all the tribute. Each *troje* had between 110,000 liters (Sahagún's figure) and 275,000 liters (the higher figure from the *Codex Mendoza*). The following step determines how many *trojes* are paid each year, which, too, is difficult to estimate. The Spanish text of the *Codex Mendoza* does not fit with the glosses and they are far from the pictographs. The text multiplies the *trojes* that contained different kinds of grains. We consider that the correct procedure is to read the pictographs, and so we have forty-two *trojes* of different grains. The *Información de 1554* did not count *trojes*. Instead it says "4,100 *fanegas*" We must also decide the frequency of the tribute. We think that the grain tribute was paid one time during the year. Of course, if one accepts more payments or more *trojes*, the storage problems will grow in the same proportion. With the data we accept, the annual grain tribute was between 4,620,000 liters and 11,550,000 liters. Putting it all together in a storehouse with a base of one hundred square meters, we will need to calculate 46.2 cubic meters in the lower estimate and 115.5 cubic meters in the higher one. If we change the base of the unit, we must change the height.

Probably there never were stores like this one, and different products may have been stored in different places, with different forms and sizes. For instance, the Conasupo cellars have a capacity between one hundred and five thousand tons (Seele and Tyrakowski 1985: 42).

If we accept the data from Tenochtitlan, there were different storehouses of diverse sizes in which they kept different items, including grains. The food supply of the city (Rojas 2001) holds a clue to consider the storage necessities. Again, estimates are difficult to calculate. The annual requirements per person are between 160 and 256 kilograms of maize—used as equivalency (Ortiz de Montellano 1993: 101)—which seems low, and the size of the population should give us a rough figure. For instance, with a population of two hundred thousand and the annual requirement of two hundred kilograms of maize per person, we need forty million kilograms of food per year. With the highest figures, the tribute was 11,550,000 kilograms. That is a difference of more than twenty-eight million kilograms. It is interesting to mention that Texcoco did have storehouses in Tenochtitlan if we believe Ixtlilxochitl (1975–77: 2:151). We also have figures from Texcoco: 31,600 fanegas of maize, 243 loads of cacao, 8,000 cocks, 5,000 *fanegas* of wide and slender chili and seeds, and 2,000 measures of salt were consumed in a year. There were also 574,010 measures of cloth, most of the last of very fine quality. All of these were kept in the storehouses the Texcocan *tlahtoani* had in Texcoco and in Mexico (Ixtlilxochitl 1975–77: 2:150–51).

Was it possible that Tlacopan and Tenochtitlan had storehouses in the other capitals, such as Texcoco? The answer is probably yes. Moreover, the three must have had storehouses in other places, in order to manage their tribute, but as usual, most of the data come from Tenochtitlan.

Outside Tenochtitlan, because of the enormous differences in city sizes, the storehouses for local consumption may have been smaller. For the towns placed along trade routes, one must assume that there was a continuous replacement of goods.

The analysis of the storage so far has been focused on grains, avoiding the inclusion of other items. Even the interpretation of data has the same bias. When Smith (2012a) concludes that there was not a grain storage system in the Aztec Empire, he means that the state did not attend to the food necessities of people. We agree with his final chapter heading: “The lack of an Aztec food policy,” but we think that this does not imply the nonexistence of storehouses, particularly for grains. The accumulation, the sumptuary expenses, and the maintenance of the royal houses may be reasons enough to store things. Batalla (2012: figs. 16–18) presents the representation of

buildings named *petlascalco* in the codices, with the indication of the things that were stored in them. Different kinds of storehouses must have been required to keep different goods. There are delicate items that could not be piled up, and so they would have needed more surface or rigid containers or a sort of shelf. We have no evidence of these storerooms, but archaeologists have not spent much time looking for them.

Even though there is scarce evidence of storehouses, there is a lot of evidence of goods in search of storerooms in every step of their life, sometimes just for a while, sometimes for years. These storehouses must have been in different places, and the ones that were along the trade routes must have renewed their contents quickly. Maybe it is better to talk about outposts where the travelers could deposit their merchandise during the night and continue on their way the next morning rather than managed storehouses. The logistics of the *pochteca* caravans need further research.

The Administration

Another indirect evidence of the existence of Aztec storehouses is the presence in the documentary sources of people in charge of the collection and administration of tribute. For the Mexico case, there are two different types of evidence: administrators residing in the royal palace at Tenochtitlan and those who were in towns and provinces subject to the Aztec Empire.

Sahagún (1975: bk. 8, [chap. 14](#), 467) refers, as discussed above, to the existence of a dependency specialized in economic affairs, named *petlascalco*, where tribute, among other obligations, was stored. This dependency was presided over by the *petlascalcatl*, also named *huey calpixqui*. The entity had *majordomos*, treasurers, counters, tax collectors, and the rest of officials in charge of the treasure (Cervantes de Salazar 1971: 1: 319; Hernández 1946: 97; Vetancurt 1971: 50). Durán (1967: 2: 323) mentions *majordomos*, factors, treasurers, and *mandoncillos* of the wards. There was another dependency named *calpixcacalli* where Durán (1967: 2: 116) places the *calpixque* who received their instructions. Sahagún (1975: bk. 8, [chap. 14](#), 467) describes it as follows:

Another room was named *calpixcacalli*, and its other name was *texancalli*. In this place all the *majordomos* of the lord got together, bringing each one the count of the tribute in his charge, to justify the accounts when the lord asked for them, and so, each day every *majordomo* prepared the tribute in his charge.

There are different texts showing the differences in categories of these

administrators. An example of this is appears in the *History* of Friar Diego Durán (1967: chap. 41, 313). There were officers for everything, even sweeping the city. There were officers in charge of one hundred, fifty, forty, or twenty houses. The officers of lesser houses were chosen by those who were in charge of one hundred houses and were their subjects.

Another category of official is the *calpixqui*. It has been understood as “tax collector” Armillas (1987: 21–23) argued over these political duties using the chronicles of the Spanish Conquest in which different *calpixque* appeared, but none is related to tribute. The existence of *calpixque* in the provinces of the empire is strongly linked to the *Codex Mendoza* in which they and their duties are specified, as mentioned in the beginning of this chapter. Their functions were collecting tribute and also governing and administering justice. In the *Relaciones Histórico-Geográficas* (1577 questionnaire) local lords, ruling their dominions, and paying tribute to the governors and majordomos that Moctezuma had placed in the different provinces, appear (Rojas 1991). In this regard, the *Codex Mendoza* evidence has been misinterpreted or ignored. The *calpixque* have been successful while the governors have almost disappeared. Even more, the *Codex Mendoza* states that the towns depicted in the tributary pages are those that have a *calpixqui*, not the tributary towns. This helps explain why conquered towns present in other sources do not appear in the tributary roll, and important towns listed are not the local Aztec capitals. This information may be useful to determine the extent of the administration of the empire and its relation to local governing bodies (see Hicks 1984, 1992).

To understand all this, it is necessary to ask what the Aztec Empire really was. The new views that appeared in 1996 owe a debt to a lot of previous research (see Rojas [Mss.] for an overall panorama). Smith (1986) pointed out a hypothesis that had been more and more accepted:

It is my contention that the primary force binding the empire together was the common interest of the Postclassic Mesoamerican nobility. Provincial ruling dynasties cooperated with the rulers of the Triple Alliance states in the economic exploitation of their local commoners. Social stratification may thus be singled out as one of the most important factors in the integration of much of the empire. (70)

The extension of familial ties among the Mesoamerican ruling class is well known. The existence of polygamy allowed the rulers to have personal ties with many other families. It was customary to exchange women, so the ties functioned in two directions. This does not mean a lack of stratification; the ruling class in Mesoamerica was strongly

stratified (see Carrasco 1974, 1984). The marriage system tended to form a web of power, very similar to the organization of the administrative officers. Each lord had subjects (who were close relatives) and were subjects (of a relative lord), except the Tenochtitlan lord in the later empire. But the status quo does not last forever. When the Triple Alliance defeated Azcapotzalco, the dynasty shifted from Azcapotzalco to Tenochtitlan (Santamarina 1998, 2006), and the local dynasties were realigned. It was possible to gain more status and higher rank via warfare, alliance, or marriage. The structure was similar in every level. The intermediate lords had spouses of superior status and of inferior status, and they gave spouses to their superior lords and to their subject lords in an intricate network of familiar relations with quite strict rules (see Carrasco 1974).

This model resembles the organization described by Durán. Each lord was promoted by his superior lord and, at his time, he named his subordinate lords, and so on, down to the lowest-rank lord. Every lord ruled over his subjects and obeyed his superiors, forming a pyramid. Colonial information found in the *Matrícula de Huexotzinco* (1974) and the *Padrones de Morelos* (see Hinz, Hartau, and Heimann-Koene 1983; Cline 1993; Díaz-Cadena 1978) confirms this model, with the presence of low-ranking administrators who depended on lords and gave them account of the tribute and duties of the people they had in charge. This forms a hierarchical ladder that works very efficiently and gives support to Smith's ideas. This chain of lords resembles much of the new map of the Aztec Empire, listing lords instead of towns.

The acceptance of this model has some implications for our understanding of storage practices. In different places it is said that the governors and *calpixque* who ruled the towns were from Mexico (*Codex Mendoza*, f. 22v, 41v); this is also said for the officers who appear in the controversial pages 17v–18r of the same *Codex* (f. 18r). It seems it was customary to put new administrators and lords in charge when the empire made a conquest: Mexica in the *tenochca* case, and we must suppose *Acolhua* in the Texcoco case, and *Tepaneca* when Tlacopan was the conqueror. Friar Diego Duran and Friar Bernardino de Sahagún agreed about this topic:

They told them the tribute that they must deliver to Mexico and they accepted it and promised to accomplish it. And leaving them collectors and a Mexican lord to rule them, they left Tlachquiahco. (Durán 1967: 2:481–482; English translation by the author).

After the province was pacified then the rural lords imposed tributes to those who had been conquered in order to give them annually to the lord who had conquered them; and the tribute consisted of what were

produced locally and then they elected governors and officers to rule that province, not from people born there but of the conquerors. (Sahagún 1975: 470; English translation by the author)

One interesting question arises here: Were these Mexican governors imposed by the conquerors really foreigners or did they have some relationship to the local community? We have seen that it was not difficult to be Mexican and, at the same time, be a member of local dynasties as a result of marriage alliances. The conqueror may have appointed Mexican governors who were members of the local ruling family. This could help reinforce the ties with the empire without losing the local links. This coincides with Smith's idea, because the local lords also formed part of the administrative structure of the empire. This analysis cannot ignore the role of the factions; the local and Mexica appointed ruler could also have been a conqueror, allied to the empire with the aim of becoming a local lord instead of being a relative. There were wars between towns, but also between different branches of a ruling family, and this helps to explain the realignments that happened after a conquest (e.g., Rojas 1994). In fact, one way to advance inside the empire was to collaborate in new conquests and receive reward for it. The power shifted from local roots to central decision makers. The most important was the ruler; the less important ruled the towns. It is possible that the real significant items could be the lords, not the towns in the way Hoekstra (1990) had shown us.

An alternative conception of polity definition, called "capital-centric" by Berman (2005), emphasizes people, not territory. As I suggest above, an *altepetl* consisted of all of the people subject to a king, wherever they happened to live. In many cases the members of an *altepetl* lived in a single continuous territory. In some cases, however, the subjects of neighboring kings lived interspersed with one another to such a degree that it is impossible to draw discrete territorial boundaries between the polities. The best known example concerns the *altepetl* of Tepechpan, Acolman and Teotihuacan in the Teotihuacan Valley (this is the Aztec *altepetl* of Teotihuacan, not the Classic period metropolis). This situation was first pointed out by Charles Gibson (1964, 44–47); see [Figure 3.6](#). It is simply not possible to draw any kind of rational territorial boundaries around the subject villages of these three *altepetl*. This distribution of settlements, however, makes perfect sense from the alternative people-focused perspective of Pre-hispanic central Mexico was transformed under Spanish rule into the European territory-based viewpoint of the organization of native communities. (Smith 2008: 91)

We think that this idea helps explain also the intermixture of territories (Carrasco 1996); there were lords with subjects in a same area. It also explains the situation of *altepetl* with more than one lord. In some cases, there was a powerful lord, with some subject lords, and in other cases, there were different lords, with their respective

subjects, and all of them were relatives. A good example of this situation for the colonial period is in Martínez's (1984) study of Tepeaca. The shift from the personal to the territorial model of domain occurred in Europe after the Conquest of Mexico, which means that the Spanish conquerors understood very well the Mexican way of organization. The study of colonial lords in Mexico (Rojas 2010) supports the personal model and gives us a clue over the double office of rulers as local lords and imperial officers: most of colonial *tlahtoque* in the sixteenth century were governors in the Spanish organization. Their relatives, who were *tlahtoque* or *tecuthli*, occupied the main posts in the *cabildo*—*alcaldes* and *regidores*—and some of them acted as judges in other towns, in service of the royal audience (Rojas 2010: [chap. 5](#)).

Storage and administration formed part of the Aztec Empire structures and we must study them in close connection with the empire interpretation. Changing our point of view has added value to new documents that allow us a new interpretation. There is new evidence and new questions in search of answers.

Some ideas come from South America and the Inka Empire (see Covey, Quave, and Covey, [Chapter 7](#), this volume). We hope that Teotihuacan will supply archaeological evidence lacking for Tenochtitlan (see Manzanilla, [Chapter 9](#), this volume), and concepts like the palace as an administrative center, as in the Near East, need to be investigated.

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CHAPTER FOURTEEN

FINAL THOUGHTS

Mitchell S Rothman and Linda R. Manzanilla

Reiteration of the Problem

Our argument at the beginning of this volume was that storage is a variable that can add to our ability to answer the core questions of early investigators and modern researchers:

- (1) What is the distinctive nature of societies and cultural systems that defines their similarities and differences?
- (2) How are/were societies organized, and how does the understanding of their organization help us understand how they functioned?
- (3) What caused fundamental changes in their nature and functioning, the evolution of new cultural systems and societal forms?

We proposed that there were patterns that repeated across many cases, although there were not general laws that could be applied in all cases, as the original New Archaeologists had proposed. There was also not a single evolutionary path, but as Steward (1955) suggested, multiple paths that societies took as they evolved.

Practice theorists might argue that therefore the task of the archaeologist should be the particular history of different cultures and societies, where the practices themselves are the source of change (see Rothman, Chapter 1, this volume). In a sense that would mean that every society is completely unique. We believe that there are repeated patterns, which reveal processes of formation and change. We further believe that comparison is at the heart of discovering patterns and common processes of behavior and of change in societies and cultures. Those patterns are not so particular that that there are an infinite number of evolutionary pathways.

The problem with comparison is the need somehow to compare like with like. Blanton et al. (1996: 2) argue that “some persons in any society will strive to influence the governing institutions of society as they pursue, variously, wealth, status, or power. Political action is inherently conflictive; actors may have diverse political aims and

varying views of the ideal form of the governing institutions and may contest for positions of power” However, a Big Man will not become a king, even if he knew what a king was. Wealth, status, and power are not attributes that are recognized by individuals in every culture. We therefore proposed that there were some kinds of relationships that characterized different societies. These categories made it possible to compare them across space and time. In [Chapter 1](#) we termed them horizontal egalitarian, vertical egalitarian, ranked coordinated, and stratified regulated (or in other words, administered). These are different than the classic step typology of Service (1962). Service’s model created a static set of types that invited the question whether society X was a tribe, a chiefdom, or a state. These usually assumed that certain, for example, means of food production always were from one or the other societal types. As the example of salmon hunters in the northwestern United States showed ([Chapter 1](#), this volume), however, a hunter-gatherer society can be ranked and coordinated, or its relationships can be those of a horizontal egalitarian society.

Table 14.1 Chronology of Areas Discussed in This Volume

NEW WORLD CHRONOLOGY			
Mesoamerica		Andean Region	
Central Mexico	Maya	Central Andes	
			AD 1520–1530
Late: Aztecs		Late Horizon: Inkas	1300
Postclassic		Chimú: Chan Chan	900
		Late Intermediate P.	
Epiclassic: Teotihuacan		Middle Horizon	500
	Classical		
	Classic Maya	Early Intermediate P.	AD 200
Preclassic			300 BC
		Early Horizon	
			1000 BC
		Initial Period: Sechin Alto	

Levant	Southern	Mesopotamia	Northern
Middle Bronze	Old Babylonian		Old Assyrian
			2600 BC
Early Bronze 4	Ur III		
Early Bronze 3	Akkadian		
			Early Ishtar
Early Bronze 2	Early Dynastic		
Early Bronze 1	Jemdet Nasr		
			3000 BC
	Late Uruk (LC4-5)		
	Middle Uruk (LC3)		
Late Chalcolithic	Early Uruk (LC2)		Late Chalcolithic (LC2-5)
			4000 BC
	Ubaid-Uruk Transition		Ubaid Transition (LC1)
			Ubaid
Early Chalcolithic			
			5000 BC
			Halaf

The emphasis among the chapters in this volume, especially the Mesoamerican and Andean cases, is on the stratified, regulated type of societal organization. The lack of general laws or easy fit into Service's model is apparent among these, because, although the examples from the two regions discuss basically state societies, those of, for example, Teotihuacan and the Inka have fundamental differences in organization, administration, strategies, and practices, as do Mesopotamian societies of the fourth to the second millennia BC (the earliest known state societies).

To be clear, the societies described here, even within one region, differ temporally, even if they are stratified and regulated. They cover a very long period of development in each area (see [Table 14.1](#)). Almost a millennium separates the Teotihuacan case described by Manzanilla ([Chapter 9](#)) from the Aztecs (De Rojas, [Chapter 13](#)), and three millennia separate the Casma Valley state described by Pozorski and Pozorski ([Chapter 5](#)) from the Inka (Covey, Quave, and Covey, [Chapter 7](#)). Close to three and a half millennia separate the earliest Mesopotamian cases described by Rothman and Fiandra ([Chapter 2](#)) and the later cases described by Paulette ([Chapter 4](#)). In one sense we are therefore comparing trajectories of change.

Still in comparing them across space and time we can see patterns in relation to their storage practices that will address the questions enumerated above.

Forms of Storage and What Is Stored

The chapters in this volume speak of a wide variety of storage units.

Understanding the actual storage practice is an important first step to finding broader patterns of societal organization and culture. Storage vehicles and placement tend to vary somewhat region to region.

In Mesopotamia, the earlier phases (Rothman and Fiandra, [Chapter 2](#)) are typified by basket, sack, and relatively small jar storage (Rothman 2002; Frangipane 2007). In other words, the most typical storage containers are ones in which goods were transported. Door sealings indicate that in addition storage rooms had restricted access. Temples and administrative buildings had large rooms, some containing remains of grain (see Rothman and Fiandra, [Chapter 2](#)) and ration bowls. A similar system existed at Arslantepe and possibly at Uruk-Warka. The dig team at Arslantepe interpreted three large rooms off the main hallway of the temple/palace structure as major storerooms ([Figure 2.8](#)). One contained very large pithoi, and the other appear to have been filled with foodstuffs. At Uruk-Warka the *Riemchengebäude* within the same Eanna Precinct as palaces and temples is thought to be a storehouse (Paulette, [Chapter 4](#)). Archaeologists recovered obsidian blades and possibly remains of grain. However, the German team excavated only a tiny percentage of the fourth millennium BC's site's more than two hundred hectares, so we really know little about the city as a whole. In the third millennium northern Mesopotamia and the Levant, large stone and clay-lined pits accommodated the major grain stores of administrative units ([Figures 3.3, 3.4, and 5.4](#)). Unlike the earlier storage practices, these represent centrally controlled storage, and a change in the types of organization doing the storing (see below).

Most of the nondomestic storage places in Mesopotamia and the Levant were built for foodstuffs, most often grain. At Tepe Gawra level VIIIA administrators also built what Rothman (2002) interprets as corrals for animals near the central storeroom. At the same time, residents of Tepe Gawra (Rothman and Fiandra, [Chapter 2](#), this volume; Rothman 2002; Rothman and Blackman 2003) were involved surprisingly early (fifth millennium BC) in long-distance exchange of fine pottery wares and stored tools. Later at 3600 BC level VIII locals manufactured and stored obsidian blades. These obsidian blades were bound for southern Mesopotamia. Researchers know this because it is possible to trace an exchange network, the Uruk expansion (Algaze 1993). The obsidian at Gawra and that in the *Riemchengebäude* both came from the same Nemrut Dag area of eastern Turkey (Paulette, [Chapter 4](#), this volume; Wright 1969). Uruk-Warka seals have images on them of women with pigtails, who were manufacturing in bulk the fine cloth that southern Mesopotamia was thought to use for exchange (Algaze 1993). More images on seals portray domed storehouses into

which workers were pouring something, presumably grain. This formal system of trade offered would-be rulers a vehicle, in addition to their agricultural estates (see below) to develop a network strategy (Blanton et al. 1996) to promote their status and culturally establish new hierarchical roles.

Mesoamerica (see [Table 14.1](#)) saw a great variety of storage units: “foodstuffs and medicinal plants for household consumption may be either solids, such as cereals, leguminous plants, cheno-ams, oily seeds, breads, and so on, or liquids, such as water and other beverages (*pulque*), stored in *pithoi* and *amphorae*, as well as in *cuexcomates* and *trojes* (outdoor granaries), storehouses, and tronco-conical pits. Storage for future agricultural cycles involved the seeds needed for such tasks, and had to be kept in outdoor storage facilities, such as *cuexcomates* (wattle-and-daub globular-shaped facilities) and *trojes* (outdoor wooden constructions), as well as sacks in indoor spaces” (Manzanilla, [Chapter 9](#), this volume; Manzanilla 1988). Before the Classic period locals stored their foodstuffs in small subterranean tronco-conical outdoor pits (Flannery 1976; Manzanilla 1985). How central the stores were can speak to the society’s organization, as can where the goods were produced and who controlled their storage.

Teotihuacan, a huge multiethnic metropolis of the Classic period in Mesoamerica, had modest domestic and neighborhood storage facilities primarily for maize, but may have had large-scale storage of sumptuary goods. Like early Mesopotamia, Teotihuacan had significant trading relationships, especially in a corridor toward the coast at Veracruz (Manzanilla 2015). A variety of products, particularly those of the coast, reached the city in their local pottery vessels and sacks.

In addition to the tribute storerooms of neighborhood nobles and in the Maya and later post-Classic Mesoamerican societies the palace’s centralized storerooms, another institutional storage practice is plausible. That would involve a marketplace. One is proposed for Tenochtitlan (de Rojas, [Chapter 13](#), this volume) and for Tikal, although none has been located in the latter case (Smyth, [Chapter 11](#)). Such a market at Teotihuacan, during the Classic period, would have been an open place attached to each neighborhood center for producers to exchange goods (Manzanilla, [Chapter 9](#), this volume).

The Maya area, because of its tropical character, had other problems with storage because of its climate. “In the lowland tropics, the storage environment of stone-walled, stone-roofed rooms are not favorable to food storage even if staples, such as maize and beans, were thoroughly dried. The fluctuating high temperature and high humidity levels in palace rooms, especially during the tropical rainy

season, produce a poor storage environment. Successful maize storage is constrained by several variables, including moisture content, temperature, humidity, storage time, and the level of fungus present” (Smyth, [Chapter 11](#), this volume). Large food storage units like Mesopotamia and the Levant were not a workable solution, and therefore food storage units were not easy for archaeologists to find. Although control of maize stores, dried, covered with lime, and placed in constructions of large logs over a stone floor, was a key to the tributary economy of the Maya, as exemplified at Tikal, the actual units were probably not together physically as they were at Amaziya in the northern Negev (Milevski et al., [Chapter 3](#), this volume). However, durable goods like cloth, imported stone, fine vessels, honey, and wax were stored in stone-built palace rooms. Vidal-Lorenzo et al. ([Chapter 12](#), this volume) cite texts that refer to these as *chultuns*. What of food storage? The site of Joya de Cerén in El Salvador gives a unique picture of domestic storage, because the site was buried by volcanic ash. Every domestic compound had separate structures for living, for cooking, and for storage. In the storage building “an adobe clay platform supported a small perishable structure, the walls and roof of which were formed entirely of branches, twigs, and clay in a wattle-and-daub construction system known locally as *bajareque*. These same materials were also used to make the single shelf or *tapanaco* generally found in these small cellars that were used to hold some of the storeroom items, with the remainder being kept in large baskets, pots, and other containers” (Vidal-Lorenzo et al., [Chapter 12](#), this volume). A rarely mentioned good that was also controlled and stored in the Maya area was water, often in underground cisterns.

Among the most complex and the latest societies described here for Mesoamerica are the sites of Xochicalco in Morelos, Mexico, in the Epiclassic and Tenochtitlan of the Aztecs in the post-Classic period (see [Table 14.1](#)). The state centered at Xochicalco had large grain storage units associated with its palace. “The *graneros* were built in a later architectural stage after the original [palace] building plan [...] The architects erected three transverse walls supported by the wall that originally enclosed the room to the north. To the south, they built another wall to ceiling height, leaving only an entrance at the eastern part of the *granero*. Access was found 1.5 meters above the room’s floor, suggesting that they would have needed to use a ladder of a perishable material to reach it. On the other hand, being the only entrance to the four *graneros*, the cross walls that divide them have a cavity between them and the south wall, creating a kind of interior elevated passageway or crawlway to go from one *granero* to another” (Garza et al.: [Figure 10.5](#), this volume). The source of the food was

likely tribute from more distant subjugated sites, as the carrying capacity of the immediate hinterland of the city was insufficient to produce the quantities estimated to be stored in the palace. Like Teotihuacan neighborhoods, the palace engaged in sumptuary trade, as well. Tenochtitlan, the capital of the Aztecs, was the largest and most complex of the societies of prehispanic Mesoamerica. Like the Inka of the Andes, the land of the Azteca was an empire ruled by governors and *calpixqui* or persons in charge of collecting tribute for the state (de Rojas, [Chapter 13](#), this volume). Storage for maize as in the Maya area was in wooden *troxes* and granaries. Although archaeologists have found no direct archaeological evidence of major central stores in the capital, Spanish chroniclers speak of massive stores of food that came in and went out of the palace.

For the Andean region the chapters in this volume discuss the Initial Period from 1800 to 1400 BC ([Chapter 5](#)), the late Chimu and Inka Empires ([Chapters 6](#) and [7](#)), and Salomon's ethnographic case ([Chapter 8](#)). T. and S. Pozorski ([Chapter 5](#)) focus on the Casma Valley, which included coastal and highland areas. Based on site size hierarchies, a regular architectural plan that lasted for many generations, and monumental public constructions, they propose that the region was hierarchically organized, centralized, and socially stratified. Food was produced on land and from the sea. In this settlement and political system, they propose that Huaca A served as a storehouse settlement (see [Figure 5.4](#)) like Raqa'i in northern Mesopotamia ([Chapter 4](#)). Access to a very typical celled building was limited. Pollen remains indicate that comptrollers stored beans and potatoes among other foodstuffs there. Other buildings with a similar plan at other sites were more administrative than storage in nature. Administrators who supervised food production and storage of food worked there. In fact, this architectural plan exists in smaller size at all the larger or more critically placed sites in the highland and the coast associated with the Casma Valley state.

The Inka Empire, which spread over much of the Andean region in the Late Horizon, roughly three millennia after the Casma Valley state, presents some similarities and differences with the earlier state. The size of the Inka Empire dwarfs that of the Casma Valley state. Whereas the Casma Valley state appears to be a well-integrated society of similar groups, the Inka Empire was a pastiche of colonized peoples. At Chan Chan (the capital of the Chimu) before the fully developed Inka appeared, a system of food storage in square storerooms already existed (Topic, [Chapter 6](#), this volume). The Inka used storage to remake many decentralized societies it conquered and remake society to provide for the Inka heartland and to continue its expansion.

“Storehouse construction supported the collection, movement, and redistribution of state surpluses. An improved road network expanded the regional scope of staple economies [...] and centrally organized camelid herding intensified high elevation grazing, providing beasts of burden and fine fiber for craft production. Staple surpluses funded local administration, whereas the means of producing wealth goods shifted to the capital region, where they supported personal connections between the Inka ruler and the nobles and officials who staffed the imperial political hierarchy” (Covey, Quave, and Covey, [Chapter 7](#), this volume). Each local official built *qollqa* storehouses in order to have food for traveling traders, officials, and soldiers along the system of roads that was the string that tied together the empire. Different storehouse types marked the different ranks in Inka society. Households built small raised wooden platforms, probably like those in the Maya area, for storing food. The roadside storage buildings were relatively small and round or square. A set of them would be used, the number depending on demand. The central storage system at Cuzco had two types of storerooms. Type 1 storehouses were basically the *qollqa*'s ([Figure 7.4](#)). Type 2 were narrow rooms, but from ten to thirty-eight meters long ([Figure 7.5](#)). Interestingly, the Type 2 storehouses were typical of incipient Inka society, whereas the *qollqa* originated at the height of Inka expansion. The Type 2 storehouses are found in the broader area in and around Cuzco on apparently noble estates and on state lands. Paleobotanists recovered remains of maize, quinoa/kiwicha seeds, and tubers there (Covey, Quave, and Covey, [Chapter 7](#), this volume; [Table 7.2](#)).

This section illustrated the great variety of storage places and kinds of goods that were stored. All were part of an evolution of societies over time in each of the regions described. We discuss their importance for understanding societal organization and the commonalities and differences in their underlying processes of development and storage as a reflection of the organization of societies in the next section.

Societal Organization and Storage

At the core of the patterns we are seeking are those that we classified as societal (organizational) and cultural (generally ideology: symbolism, religion, values, beliefs, and so on). Organization describes types, as mentioned above, but the types, as Harris (1968) said back in the days of Louis Binford, are simply our intellectual models. Underlying the types are practices and relationships and human intentionality (agency). The task of the scholar is to see the details of human activity as individuals (where possible), but more likely in the

groups and associations in which humans participate willingly or unwillingly.

The patterns reflect the conscious goals of individuals and groups and the methods (the cultural) they use to make the system work, as Blanton et al. (1996) suggest. This is where agency comes into the picture (see Rothman, [Chapter 1](#), this volume). The problem with the agency concept is that even practice theorists agree that decisions are made within a social structure. They would emphasize a more cultural one than many positivists who favor the political and economic systems, but they, too, acknowledge that agency in a horizontal egalitarian society is not going to be the same as that in a stratified, regulated one. These patterns for us emphasize potentially different players' control of that which is produced and that which is stored. Control in the egalitarian societies is spread equally across the society, or perhaps handled by individual households, mostly with an eye to subsistence. In the ranked and stratified societies control is distributed unequally in the hands of fewer individuals or groups who consciously plot to promote their own benefit, except in cases where their goals are seen as promoting their whole society's best interests—Blanton et al.'s (1996) corporate strategy. Administration in the case of stratified, regulated societies is the formalization or systemization of those controls. Hence, Wallace (1971) contrasts communal or kinship with administrative forms of social organization. Power in that sense is the ability of individuals or groups to impose their control and their decision making on others in an inherently stratified, unequal society, as Wright and Johnson (1975) recognized long ago.

Who had control and what their goals and strategies were becomes evident in storage practices (see above), as are the various kinds of groups that are active players in that society. The inherent heterogeneity of stratified societies is evident in this variety of groupings; for example, the ethnic mix at Teotihuacan (Manzanilla, [Chapter 9](#), this volume). The metropolis had three distinct rings: an outer ring occupied by “foreign” ethnics, a secondary ring made up of self-governing neighborhoods of locals, possibly of a kind of middle rank, and the inner circle where the rulers of the city and polity lived and worked. The Teotihuacan state, however, lacked a truly centralized control center, and despite its size maybe even a ruler's palace (Manzanilla, [Chapter 9](#), this volume). Rather, nobles in each neighborhood controlled local storage places. For the Maya, “while there were indeed very powerful and dominating ruling centers, the ruling classes did not hold a total control over production and, as such, it is not possible to speak of just one Mayan economic system at state level, but rather of regional and, in some cases, interregional

economic systems” (Vidal-Lorenzo et al., [Chapter 12](#), this volume). This then means that, with the exception of certain relevant cases, the control exercised by the leaders of the different political bodies over production and trade would have been restricted only to certain products. However, the systems of the Chimú and Inka, evident in their network of central and regional storage systems, were very much centralized (Topic, [Chapter 6](#), and Covey, Quave, and Covey, [Chapter 7](#), this volume).

At Xochicalco, Morelos, Mexico (Garza-Tarazona et al., [Chapter 10](#), this volume), a similar pattern is evident. Households have associated food storage units, but the palace had a large centralized storage system. In the Acropolis area of the palace, a series of large *graneros* likely held huge surplus stores of maize. Rulers of the city created a centralized, redistribution system through military violence against surrounding settlements, and a tributary system that the palace center controlled, so that many families who were not primarily farmers in the city would be fed and dependent on the palace. The third millennium BC societies of the Levant (Milevski et al., [Chapter 3](#), this volume) and of Mesopotamia (Rothman and Fiandra, [Chapter 2](#), and Paulette, [Chapter 4](#), this volume) show a centralizing tendency in storage and societal organization, as well.

At the same time, heterogeneity is a part of all the more complex societal systems studied here. The attempts of Mesopotamians to create an empire based on a model of expanding city-states are evident in northern Mesopotamia (Paulette, [Chapter 4](#)), and the need to integrate various ethnic and occupational groups is indicated already at Tepe Gawra (the pastoral and trader groups from the highlands [Rothman and Fiandra, [Chapter 2](#)]), as well as in the fourth and early third millennia BC at Arslantepe (Rothman and Fiandra, [Chapter 2](#); Frangipane 2014). This leads Manzanilla ([Chapter 9](#)) to conclude that the emphasis on auditing (see below) tortilla rations in the Teotihuacan neighborhoods favors labor over goods, although at the same time, the use of stored sumptuary goods is part of the cultural means nobles use to symbolize and re-inforce their status and positions of authority (see below).

The agency discussed above occurs at various levels of society, whether the least complex one discussed in this volume, societies of the Halaf Period (Rothman and Fiandra, [Chapter 2](#)), to the most complex, the Inka of the Andes (Covey, Quave, and Covey, [Chapter 7](#)). What the earliest examples show is that at the base of all these societies are a household economy, and as the model in [Table 1.1](#) predicts, household storage. In these horizontal egalitarian societies, mostly the storage is of the same type. As control systems begin to

develop in the fourth millennium in northern Mesopotamia, again the basic units of organization were extended households with what Fiske calls equality sharing (see Rothman, [Chapter 1](#)). As relations outside the site were forged through long-distance exchange and perhaps marriage patterns, however, it became important to integrate these households. Such shared activities, as mentioned in [Chapter 1](#), were already evident at the beginning of the Neolithic in the Middle East when goods were collected and stored for common feasting. At Tepe Gawra the transformation into a vertical egalitarian society is evident in a common grain and craft good storage. The auditing system of control for storage, seals, and sealings (see below), however, seems to indicate a common access to stored goods and most likely a shared benefit from the exchange of goods outside the site. Contrary to Blanton et al. (1996), in earlier pre-state societies a network strategy does not have to imply a system of exclusionary (stratified) control and ultimately power. By the LC3 (3600 BC) at Tepe Gawra (see [Table 14.1](#)) evidence of a kind of direct control by a now more centralized authority is clear. This development is even clearer at Arslantepe and at Uruk-Warka, the latter the world's oldest true city and urban settlement system (Nissen 2001).

Stored Surplus and Evolution

At the heart of this change toward a ranked and then stratified (state) form of societal organization is the concept of surplus inherent in the system or created by leaders consciously to further their goals. Surplus implies storage. As Smyth ([Chapter 11](#), this volume) writes: “If the fundamental material power base of Maya elites rested upon the control of land, labor, and the material by-products thereof, then *the storage of surplus goods generated and the political-economic strategies employed to support the state should be closely related* ” (emphasis his). In other words, storage strategies should reflect the political power structures. The earlier concept in anthropology was that these were all redistributive systems (Service 1962, 144; Fried 1967). That is, goods were collected and then returned to members of the society. The necessity of coordinating this redistributive system created an avenue for individuals or more likely kin-related groups to promote themselves to positions of higher rank through their task as controllers. Whereas such systems no doubt existed and exist ethnographically in various vertical egalitarian types of societies like those at Tepe Gawra XII (see above), more and more scholars questioned whether these redistribution systems were not designed to benefit the coordinators over the general populace (Earle 1977). Paulette ([Chapter 4](#), this volume) paints a picture of third to second

millennium states where “in Mesopotamia, [stored] grain was king, or, to put it more accurately, grain *made* kings” A system of massive store-towns like Raga'i existed, which speaks not only to the centrality of storage but to its scale and its relation to the evolution of states.

What was the source of these stored surpluses and what was their role in the strategies of various groups? As Wright (2000) argues, there is a clear relation between tributary systems and the evolution and elaboration of hierarchically organized systems. That surplus, according to Wright, involves not only extracting food from the local populace, but intensifying production. In Mesopotamia, the state extracted tax or tribute, but its primary means of supporting its activities was its own agricultural estates. Labor was recruited from villages, but also a semipermanent dependent labor force supported by the palace and temple institutions' stores of grain. Whereas the private households practiced a strategy to guarantee their subsistence (minimax), the state pushed for maximal returns (Baysian) to support military expansion, constructing public architecture, and network relations with other kings (Rothman 1994a). This policy was continued even when it led to large-scale salinization of the soil and with that the collapse of dynasties or their military expansion into new territories with potential for more surpluses.

Manzanilla (Chapter 9, this volume) points to the importance of stored maize in neighborhood centers headed by the intermediate elite, made into *tortillas* as rations for labor in craft workshops (Manzanilla 2011). The evolution from the early states to the first empires was literally paid for by stored grain (Paulette, Chapter 4, this volume). Wright (2000: 11) distinguishes between labor and goods tribute, which makes sense in terms of the goals of leadership in particular cases: “where land is available and transport difficult, labor tribute might be more effective, but where land is scarce and transport easy, goods tribute might be more effective.” He notes that most state leaders use both approaches. We would argue that they are systematically related. One cannot have one without the other. Grain is not stored for a long period merely as accumulated wealth. It is stored to distribute in payment for some return to the controllers of the storehouses.

The empire or colonial model of state functioning and state leaders' goals intensifies this need for tribute and changes in storage practice. In the Levant throughout much of the fifth into the fourth millennium BC, patterns are evidenced of largely self-sustaining, egalitarian villages (Greenberg 2002). Contact through networks of exchange reached into northern Mesopotamia. At Tel Tsaf, for example, a few pots and a single seal indicate at least contact through down-the-line

trade with the 'Ubaid world in Mesopotamia. There large stone-lined storage pits for grain were built associated with each household (Garfinkel, Ben-Shlomo, and Kuperman 2009). Tell Amaziya in the Northern Negev was occupied in the Early Bronze I and IV (see [Table 14.1](#)). These are periods before and after urbanization in the Levant. In the northern Negev, most Early Bronze I sites were small, self-sufficient villages. Amaziya was larger. Milevski et al. ([Chapter 3](#), this volume) describe a whole district of the site in which residents concentrated storage pits like those at Tel Tsaf, presumably for grain. They assert that these silos must have contained much more food than the residents of the site could possibly have used. They further suggest that there are two possible explanations for the concentration of foodstuffs. One is a local tributary system in which wealth is amassed by a ruling group that uses it to redistribute to local people in exchange for labor service or loyalty. However, there are few signs of differential access to goods, larger houses, or other signs of inequality. Perhaps there is a system of developing administration like the one postulated for the Pueblo Indians with controlling groups symbolically hidden beneath the ideology and symbols of kinship organization (Mills 2000); as noted in this volume, there are no physical remains of administrative hardware like in Mesopotamia (Rothman and Fiandra, [Chapter 2](#)), Mesoamerica (Manzanilla, [Chapter 9](#); de Rojas, [Chapter 13](#)), or the Andes (Pozorski and Pozorski, [Chapter 5](#); Topic, [Chapter 6](#); Salomon, de las Casas, and Falcon-Huayta, [Chapter 8](#)). Alternatively, they postulate that an Egyptian colony system had penetrated this part of the Negev and the surplus in fact was going to them. "Tell es-Sakan appears to have been the core, or 'mother colony' of an Egyptian colonization effort under royal auspices, and may well have been the gateway for the virtual flood of Egyptian goods that marks a primary zone of activity at specific sites north of Tell es-Sakan along the southern stretch of the Mediterranean Littoral at the end of EB I" (Milevski et al., [Chapter 3](#)). The Inka colonial system is the most obvious case where storage and colonial expansion correlate. "As Inka dominion spread, Inka Yupanque (Pachacutic) issued decrees regulating storage and establishing Cuzco's political economy. The first of these required subject populations to produce surplus staple goods and transport them to Cuzco" (Covey, Quave, and Covey, [Chapter 7](#)).

These cases all have a degree of complexity that would seem to distinguish them. The particular goals, circumstances, and strategies used by each group from the subsistence-oriented households to the status-oriented, and possibly power-seeking minority are different. However, in each region increasing surplus and increasing storage tend to correlate with increasingly centralized societies. This common

pattern of increasingly centralized storage correlating with increasingly complex societies seems to hold regardless of place or absolute time. Its corollary, that in vertical egalitarian and ranked societies central storage is less prominent and where some communal storage exists, its control is manifested in the whole community as equality sharing is suggested by the Mesopotamian cases.

Administrative Mechanisms, Storage, and Organization

If, as we argue, storage is an indicator of control mechanisms that reflect societal organization, then the mechanisms of control—in stratified, regulated societies' administration—indicate how this organization actually functioned. As Fiandra (Rothman and Fiandra, [Chapter 2](#), this volume), Frangipane (2007), and Rothman (1994b, 2007), have pointed out, auditing is one of the key elements in the administrative process.

Some researchers assume that the presence of seals alone is an automatic sign of an administered system. Akkermans and Verhoeven (1995) have shown that even a Neolithic site in northern Mesopotamia, Sabi Abyad, had both seals and their impression on clay locks (sealings); both the seal and what was sealed have to be present for them to be mechanisms of control. In the Near East this system began not so much as administrative; that is, control by an institution vested with the authority to administer and make decisions that others had to follow (authority), but as the equivalent of individuals' signatures.

As noted in this volume, as time passed and organization changed from an egalitarian to a ranked to stratified, regulated (administered) types of social relationships, the message-bearing ability of stamp, then cylinder seals, and finally clay tablets with writing (often also sealed now by office holders rather than individuals) increased (Rothman and Fiandra, [Chapter 2](#)). The storage practice in each phase along this evolutionary trajectory became more centralized and also increased in scale (Paulette, [Chapter 4](#); Rothman and Fiandra, [Chapter 2](#)).

Scale (see [Chapter 1](#), this volume) is a critical factor in this trajectory of changing relationships. The necessary system for control and the mechanisms used depend in large measure on the scale of the society. Scale here is measured a number of ways, from geographical area to population size to degree of heterogeneity to the size of network connections outside the frontiers or in stratified societies' borders. Nissen (1977) theorizes that the addition of cylinder seals to stamp seals in Mesopotamia occurred because there were fewer face-

to-face contacts. People who had to be authorized to break sealings and access the goods stored would be less familiar with individual seal designs (signatures) and needed more information on offices and office holders; the increased information required more space than a cylinder seal provided. It is interesting to note that this sealing technology, although known in the area, was not adopted in the Levant.

Scale is certainly in play in the Andes region. Comparing the Casma Valley state of approximately 1500 BC with that of the Inka Empire three millennia later shows the effect of increased scale and different goals and practices of administrators in their storage and auditing practices. T. and S. Pozorski ([Chapter 5](#), this volume) present evidence of sealing behavior. Both stamp and cylinder seals appeared in administrative contexts at key sites in the Casma Valley area ([Figure 5.12](#)). Unlike the Mesopotamian seals they were not applied to clay locks. Their use was not so much about auditing. Manzanilla (2009: fig. 2.6; 2011: fig. 5) also found circular stamp seals in the neighborhood center of Teopancazco in Teotihuacan, which are morphologically different from curved seals for body paint; the stamp seals may be related to the control of crafts in the neighborhood center by the intermediate elite.

The clay lock sealing in Mesopotamia was the physical representation of items that were received and then disbursed. At Arslantepe (Rothman and Fiandra, [Chapter 2](#), this volume) sealings were found in a room used as a trash dump in clumps the shape of a basket. Apparently, an auditor counted the contributions from various sources of tax or tribute as they came into the storeroom. They were thrown into a basket, and at a particular interval, a week or month, they were counted, somehow recorded or communicated to the top level of administration, and then dumped at one time in the trash. The counting then began again. In the Pozorskis' case, they suggest that the stamps were applied on cloth or perhaps on the skin of people. The suggestion is that these were signatures of ownership. They may have been recorded in some fashion, so-and-so many workers of person X were contributed to the state project of building such and such or growing maize in the state fields. Person X contributed so much cloth to the state treasury, and so on. As in the Levant, the absence of physical remains of auditing does not mean that activities were not administered or audited. Physical artifacts of administration did not exist or did not get preserved.

The Inka Empire was too large, too complex, and lasted too long for it not to have some kind of formal administrative system. As described by Covey, Quave, and Covey ([Chapter 7](#), see above) the Inka system of

conquest and then of administration was consciously planned using a network of roads and storehouses to tie it together. The flow of goods was either from the local area into the roadside storehouses or into Cuzco itself, where a whole series of storehouses controlled by nobles and by the highest levels of state administrators of the Inka were located. This flow, according to Covey, Quave, and Covey, fueled craft production in Cuzco, some of which went back out to governors and loyal factions in the empire as sumptuary goods. Topic ([Chapter 6](#)) shows how the Chimú administrative system may have worked. One element in this system was the *quipu* or a set of knotted strings that recorded a mnemonic set of numbers. There were in addition various colors that could signify what was being counted or even permit an administrator to make a new *quipu* that summarized the information in other *quipus*. A “correlation of cognitive ranking with the sequential ordering of the strings again emphasizes the structural importance of the place or position, with predefined value, in which numbers are recorded. However, the significance of the positions and qualifiers has to be learned and communicated from one bureaucrat to another; they are not inherent in the sense that an S-spun brown cotton string, in the third position on a larger *quipu*, will always record information about the same category of thing” (Topic, [Chapter 6](#)). Topic points out that *quipu*’s existed as early as AD 700, but the Inka ones were quite different, reflecting a new organization of administration and new goals and strategies of the leaders. An indication of the planning and complexity of the Inka system is that to make the *quipu*’s (which were numbers, not words) work, the Inka adopted a system of standardized storage buildings first evidenced at Chan Chan (the Chimu capital) during the Late Intermediate Period, just before the establishment of the Inka Empire in the Late Horizon. The Spanish records called these buildings *audiencia*. “*Audiencia* is used here in a generic sense to encompass a set of structures, with varying characteristics, that include types referred to as *audiencia* variants, *arcones*, *trocaderos*, and *tablados* [...]. These types of structures frequently have just three walls and are open on the fourth side, like a block letter *U*; sometimes, however, their layout is more like a block letter *C* ([Figure 6.4](#))” (Topic, [Chapter 6](#)). He proposes that the information in the *quipus* was tied to these standardized storage building configurations. Most were for foodstuffs.

Many of the administrative systems here (for the Aztec, see above) are directed toward inputs of tribute or tax into the centers, large or small. They also record disbursements, but it is the inflow and outflow of goods that interests the auditors. At Teotihuacan, centuries before the Inka or Aztec, the use of tokens for labor indicates a different focus (Manzanilla, [Chapter 9](#), this volume). Manzanilla proposes that a

series of small round tokens of differing size coded the amount of tortilla rations given to workers, especially to craftspeople. The age was coded (children got a different amount and therefore a different-size token was used). In this way the nobles who supplied the tortillas could keep track of how much maize would be needed to pay for the work of making sumptuary goods, and presumably the amount of maize needed for feeding themselves and their other dependents and providing seed for the next growing season; stamp seals (see Manzanilla 2009: [fig. 2.6](#); 2011: [fig. 5](#)) are the only administrative tool that survived, leaving aside the codices of the late post-Classic period.

Not every society described in this volume had administrative tools, at least not ones that survived over the long time they remained in the ground. Where they do exist, our understanding of their purpose and the goals of players in the administrative forms of social organization is enhanced. Here, the administrative mechanisms are tied very closely to storage practice at the nonhousehold—archaeologists find few household auditing tools—administrative level. They paint a similar picture to one described above. Increasing control of larger and more centralized storage systems correlates with the increasing centralization of the societies involved.

Cultural Factors and Administration

Societies have long been the focus of processualist archaeologists, as reflected in much of the discussion above. Economic, political, and social organization has been the key factor for archaeological analysis. Postprocessualists, on the one hand, and art historians, on the other, are right, however, to say that the cultural elements of ideology, symbolism (and art), beliefs, values, and so on, are also critical. The problem has always been how to understand them. Rarely, even with written records, do we know what symbols, and religious practices, actually meant to the ancients. We can see how they were used and theorize about why they might have been used in a particular way, which is important, but perhaps a bit amorphous, which in part is why archaeologists really since World War II have favored the societal to the cultural.

One question is, how do these ancient societies, especially the states, motivated people to embrace or at least go along with this whole system of tribute or taxation and communal or state storage? Salomon et al. ([Chapter 8](#)), our one ethnographic contribution, give us a possible way to look at some of relationships among ritual, governance, and storage: “Until the mid-twentieth century, the village

of Rapaz (Peru) managed its communal sector (fields, canals, terraces, pastures, and herds) through a ritual-administrative complex seated in a walled precinct. One of the precinct's two buildings is called *Pasa Qulqa* ("Storehouse of Seasons"). The other is a still-used sacred building, the home of a collection of *quipu*'s, where traditional authorities govern the common sector. It is called Kaha Wayi, "Treasury House." These institutions have been attributed to integrating the adaptations of different zones within the Inka/Peruvian landscape, but "the range of feelings and questions that arise from behavior in it, and the symbols that express them—contributes to the articulated set of symbols we call Andean culture" (Salomon et al., [Chapter 8](#)). These institutions of ritual, governance, and storage are separated from the rest of the village behind a small stone wall. In village rituals, the *quipu*'s are actually worn by the officiants as part of their traditional garb. The community controls agricultural and pastoral production. No one owns their productive land; it belongs to the community. Agriculture within the community is regulated by a hierarchically constituted agricultural committee, which is part of the community's larger organization in dealing with the Peruvian state, but which is the sole arbiter of community food production (when the Peruvian state forced the community to partition its fields into private hands, this system faded). At planting and harvest times, the officials take on the role of ritual leaders, singing songs and hosting a feast of meats from animals in the storehouse. The whole system from community ownership (in ancient times, noble ownership?) to production to storage is regulated by a social structure that has economic and political aspects, but ultimately is embraced by the population through its ritual and spiritual practices and beliefs.

At the heart of this whole system of controlled storage in all regions was the belief of people in the rightness of the social order. The establishment and legitimization of rank and authority cannot be seen now or in ancient times as simply a matter of a practical solution to economic problems. It must fit with a larger ideology and set of accepted symbols that summarize the status of individuals in charge, and can change and be elaborated in changing systems. If Paulette ([Chapter 4](#), this volume) is correct, and states are really not so much controlling as integrating in many respects pieces of semiautonomous communities, this ideological/symbolic mode of establishing authority and the current order was essential. It reflected the core role of state leaders. For example, as the Uruk expansion trading network was formed, one of the primary characteristics of the gods became supernatural forces that brought beneficial goods from afar (Jacobsen 1976). The king's family often provided stand-ins for the goddess Inanna or the god Dumuzi during the spring fertility ritual.

In prehispanic Peru, the Pozorskis see the storage units as symbols of authority. “Based on the recurring presence and consistent form of the square-room unit and its constant use in administrative contexts within the Sechín Alto Polity, we suggest that this modular architectural form also functioned more broadly as a tangible symbol of the power and control exerted by Sechín Alto Polity leaders” (Chapter 5, this volume). Symbols of jaguars and other spiritual symbols appeared on the outside of the cell buildings (see Figure 5.11). The production of sumptuary goods for nobles at Teotihuacan seems to have been a major focus of the productive enterprise. Although exchange of sumptuary goods along the corridor to Veracruz was probably important to maintain trade for other goods, including food, the amount of effort seems too great just for economic exchange (Manzanilla, Chapter 9, this volume; Manzanilla 2015). Although archaeologists found no palace, the monumentality of the Pyramids of the Sun, Moon, and Feathered Serpent speaks to an important ritual life. Participants in the rituals there must have needed elaborate dress, as well as different elites and ethnic groups needed visual ways to display their identity, in this multiethnic environment. Their participation no doubt reinforced their noble status and their authority over their neighborhoods.

In the Maya area “the iconographic representations found on ceramic pots and on the vaults of a number of palaces in Campeche and Yucatan, the god K’awil has been painted together with sacks of this type full of grain and bearing inscriptions referring to abundance and prosperity” (Vidal-Lorenzo et al., Chapter 12, this volume).

Even the locations of administrative, storage, and economic institutions were marked as ideologically special. The walled Eanna Precinct of Uruk-Warka stood at the center of the mound on a raised hill (Nissen 2001). It should have been visible to many satellite sites. Similarly, “the founders of Xochicalco chose a hill 120 meters above the surrounding terrain, making the most of the topography in order to establish hierarchical levels, which reflect the spatial order of the city [...] Consequently, the highest part of the hill was restricted to political and administrative activities, rituals, and the residences of high officials” (Garza-Tarazona et al., Chapter 10, this volume). Archaeologists recovered artifacts like censers, animal bone, and masks downhill from the Acropolis that most likely had a ritual function.

These ritual and ideological aspects discussed above only begin to plumb the many elements of cultural ideas and behaviors that relate to the economic and political organization of these various societies, but again they link culture to organization to storage.

Causes of Change

One of the ironies of modern archaeology is somewhat of an inability to agree on and clearly articulate the causes of change. The aspect that archaeologists contribute to anthropology, history, and art history is in fact the ability to speak about long-term change, evolution. The practice theorists, who seem to be gaining in influence on the younger generation of archaeologists, basically put off this “why” question to some future time (see [Chapter 1](#), this volume). To our eyes, they seem to ignore the fact that human agency, goals, and practices are not so independent of circumstances and organizational structures. As we argued above, the possibilities for setting goals are always limited by organizational perspectives. Again, a Big Man will not become a king nor will he aspire to wealth or power; he will not cognize what these concepts are. Vitelli (1999) reminds us to look up, not look back. No one planting the first crops in the ancient world said to themselves, “Let’s do this, so that sometime in the future our heirs can have surpluses that will permit them to gain high rank, whatever that is.” Long-term change is rarely considered by members of any society. Human agency and strategies are always constrained and directed by unplanned, stochastic factors, like floods, hurricanes, conquests, plagues, droughts, historical animosities, needed cooperation, and anticipated and unanticipated competition. They flow out of possibilities given their economic, social, and political circumstances. In [Chapter 7](#) (this volume), Covey, Quave, and Covey argue that risk is a reason for the storage system of the Inka Empire. Adams (1981) similarly argues that urbanism and with it stratified, regulated societies in southern Mesopotamia evolved to solve the dual problem of increasing population size and productive agricultural regimes that nonetheless underperform in three of every five years. That risk and uncertainty (the belief there is risk) are factors in decision making is undoubtedly true. But we, and the practice theorists, would say that is not the whole story.

We spoke about patterns in [Chapter 1](#) and processes. We believe that the contributions here have added new cases and new dynamic models for organization and change in three key regions of the ancient world. We believe we have shown that political and economic centralization correlates with changes in storage behavior in many places and many times. We believe that the heterogeneity of complex societies (states) adds impetus to this process of centralization in order to solve the need for integration.

At the same time, we know that this volume is not *the* definitive word, but just a kind of next step in the search for why. Neither

processualist nor practice theory alone will get us to the answers to why. We leave that intellectual struggle for generations of archaeologists to come. We hope they see the importance of waging it.

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